FURUNO

# INSTALLATION MANUAL

## INMARSAT FLEET F77
## SHIP EARTH STATION

MODEL **FELCOM 70**

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

PRINTED IN JAPAN

# ⚠ SAFETY INSTRUCTIONS

## ⚠ WARNING

**Do not open the equipment unless totally familiar with electrical circuits and service manual.**

**ELECTRICAL SHOCK HAZARD**

Only qualified personnel should work inside the equipment.

**Do not approach the radome closer than 4 meters when it is transmitting.**

The radome emits radio waves which can be harmful to the human body, particularly the eyes.

| RF power density on antenna aperture | distance |
|---|---|
| 100W/m$^2$ | nil |
| 25W/m$^2$ | 2.0 m |
| 10W/m$^2$ | 4.0 m |

**Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.**

Fire, electrical shock or serious injury can result if the power is left on or is applied while the eqiuipment is being installed.

## ⚠ WARNING

**Ground the equipment to prevent electrical shock and mutual interference.**

**Confirm that the power supply voltage is compatible with the voltage rating of the equipment.**

Connection to the wrong power supply can cause fire or equipment damage. The voltage rating appears on the label at the rear of the display unit.

**Use the correct fuse.**

Use of a wrong fuse can cause fire or equipment damage.

**Keep the following compass safe distances.**

| | Standard | Steering |
|---|---|---|
| Antenna Unit | 0.65 m | 0.30 m |
| Communication Unit | 1.00 m | 0.60 m |
| Distress Alert Unit | 0.30 m | 0.30 m |
| ISDN Handset | 1.00 m | 0.65 m |
| Facsimile | 1.30 m | 0.80 m |
| Telephone | 0.50 m | 0.40 m |

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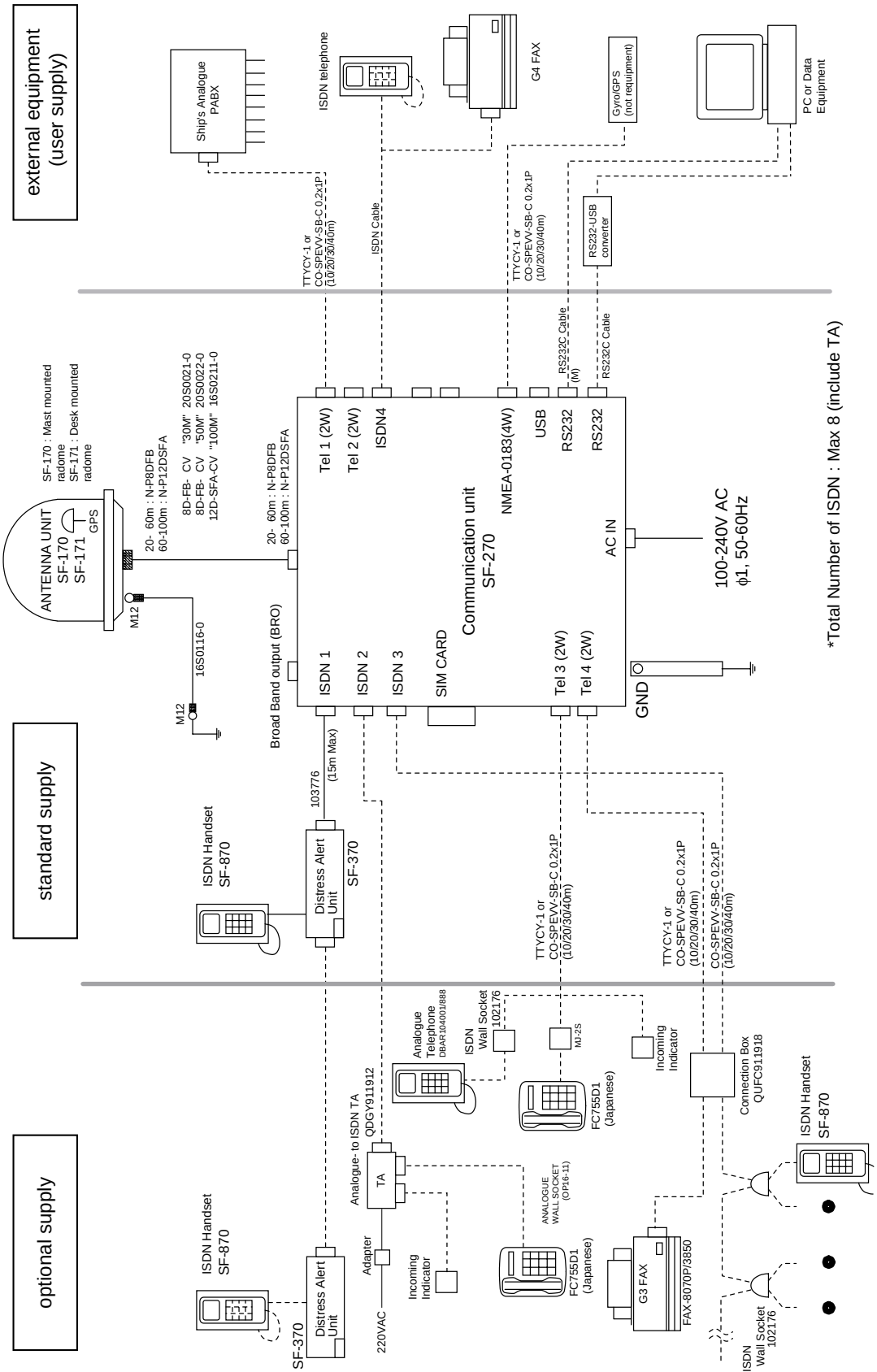
# SYSTEM CONFIGURATION



# EQUIPMENT LISTS

## Standard Supply

| Name | Type | Code No. | Qty | Remarks |
|---|---|---|---|---|
| Antenna Unit | SF-171 | - | 1 | |
| | SF-170 | | | |
| Communication Unit | SF-270 | - | 1 | |
| ISDN Handset | SF-870 | - | 1 | |
| Distress Alert Unit | SF-370 | - | 1 | |
| Installation Materials | CP16-02800 | 000-043-251 | 1 | Power cable for communication unit |
| | CP16-02701 | 004-446-480 | 1 | for antenna unit |
| | CP16-02700 | 000-043-209 | 1 | Cable 8D-FB-CV (30m), CP16-02702 |
| | CP16-02710 | 000-043-210 | | Cable 8D-FB-CV (50m), CP16-02702 |
| | CP16-02720 | 000-043-219 | | Cable 12D-SFA-CV (100m), CP16-02703 |
| | CP16-02900 | 000-043-445 | 1 | Signal cable for Distress alert unit |
| Spare Parts | SP16-01501 | 004-446-470 | 1 | for antenna unit |
| | SP16-01601 | 004-447-160 | 1 | Fuses for communication unit |
| Accessories | FP16-00800 | 000-043-356 | 1 | for ISDN handset |
| | FP16-03000 | 000-043-466 | 1 | CD-ROM for communication unit |

## Optional Supply

| Name | Type | Code No. | Qty | Remarks |
|---|---|---|---|---|
| Facsimile | FAX-8070P | - | 1 set | For CE type, w/CP16-02601 |
| | FAX-2850 | - | | w/CP16-02601 |
| | MFC-4800J | - | | Japanese version |
| Drum Unit | DR-10J | 000-146-598 | 1 | For above Facsimile |
| Toner Cartridge | TN-10J | 000-146-599 | 1 | For above Facsimile |
| Telephone | FC755D1 | - | 1 set | w/CP16-00511, 00512 |
| Antenna Cover | QB05-1801 | 100-079-480 | 1 | |
| Modular Jack Box | OP16-10 | 000-043-278 | 1 | Box type |
| | OP16-11 | 000-043-279 | 1 | Flush mount type |
| Modular Jack Set | OP16-13 | 000-043-228 | 1 | |
| Lifting Metal | OP16-15 | 004-442-460 | 1 | |
| 2-pair cable | CO-SPEVV-SB-C 0.2x2P | 000-120-792 | 1 | For ISDN connection, 10m |
| | | 000-120-794 | | For ISDN connection, 20m |
| | | 000-120-214 | | For ISDN connection, 30m |
| | | 000-132-827 | | For ISDN connection, 40m |
| | | 000-132-826 | | For ISDN connection, 50m |
| 1-pair cable | CO-SPEVV-SB-C 0.2x1P | 000-110-681 | 1 | For Analog Telephone, 10m |
| | | 000-138-789 | | For Analog Telephone, 20m |
| | | 000-138-790 | | For Analog Telephone, 30m |
| | | 000-138-791 | | For Analog Telephone, 40m |
| | | 000-138-792 | | For Analog Telephone, 50m |
| Transformer | 0P16-25 | 004-446-850 | 1 | Transformer E-300+cable<br>100VAC→220VAC (300VA)<br>For FAX-2850 or FAX-8070P |
| Analogue Telephone | DBAR 104001/888 | 000-147-693 | 1 | |
| Terminal Adapter | QDGY911912 | 000-147-698 | 1 | |
| ISDN Wall Socket | 102176 | 000-147-699 | 1 | |
| ISDN Handset | SF-870 | 000-043-252 | 1 | |
| Connection Box | QUFC911918 | 000-147-700 | 1 | |
| Distress Alert Unit | SF-370 | - | 1 | |
| Incoming Indicator | KK-893-3977 | 000-148-478 | 1 | For analogue telephone line |
| Transformer | SD-221 | - | 1 | For facsimile MFC-4800J |

# 1. PLANNING

## 1.1 Placing the antenna unit

**General**

FELCOM 70 is delivered either with mast mounted or deck mounted radome. The mast mounted version includes a hatch which provides access for service and repair, whereas the deck mounted version must be lifted down. Interfering objects (especially metallic objects such as masts) near the antenna can, in the worst case, prevent reception or transmission. Further, RF radiation from the antenna will affect the human body. Keep these and the following guidelines in mind when selecting a mounting location for the antenna unit.

**Secure unobstructed path in all directions**

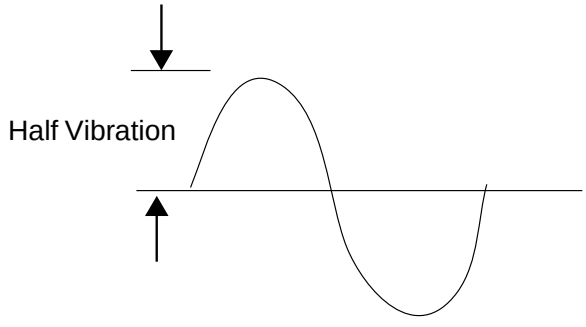
The ideal mounting location secures an unobstructed path between the antenna unit and the satellites, from horizontal to zenith. In order words, whatever the direction the antenna unit is pointing there are no interfering objects within the main beam (16 degrees). While this might be feasible on some vessels, on others it is impossible due to space considerations. The antenna unit should be located at least 3 meters away from masts having a diameter less than 15 centimeters.

**Select a location low in vibration**

The maximum permissible vibration amplitude in three axis direction should be as shown in the table at the top of the next page. Consult with the shipyard to determine the mounting location which meets the requirements shown in the table.

The table at the top of the next page is taken from Inmarsat's System Definition Manual (SDM) and defines frequency and maximum vibration amplitude.

| Freq. Range | Max. Amplitude |
|---|---|
| 4 to 10 Hz | 2.54 mm (max. 9.8 m/s$^2$) |
| 10 to 15 Hz | 0.76 mm (max. 6.86 m/s$^2$) |
| 15 to 25 Hz | 0.40 mm (max. 9.8 m/s$^2$) |
| 25 to 33 Hz | 0.23 mm (max. 9.8 m/s$^2$) |




*Max. amplitudes*

## Locate away from passengers and crew

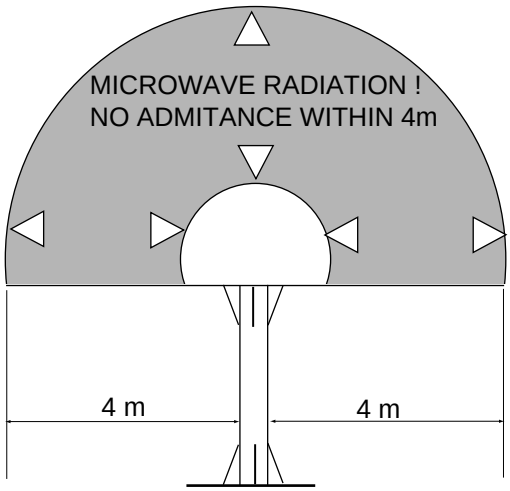
Radio waves can be harmful to the human body. Since safe distances vary by country and ship construction there is no uniform formula for calculating safe distance. However, below are general guidelines.

- Personnel should not approach an area in which the radiation level is higher than 10 W/m$^2$, i.e., within 4 m from the radome surface.

**⚠ WARNING**

**Do not approatch within 4 meters of the antenna radome when it is transmiting. Microwave radiation can be harmful to the human body, particularly the eyes.**

Construct a protection fence around the antenna unit in order that personnel can not approach the antenna unit within 4 m. Also, to alert personnel not to approach the antenna unit, attach the caution labels (supplied as installation materials) to any bulkhead which is at the position of 4 m from the antenna unit.



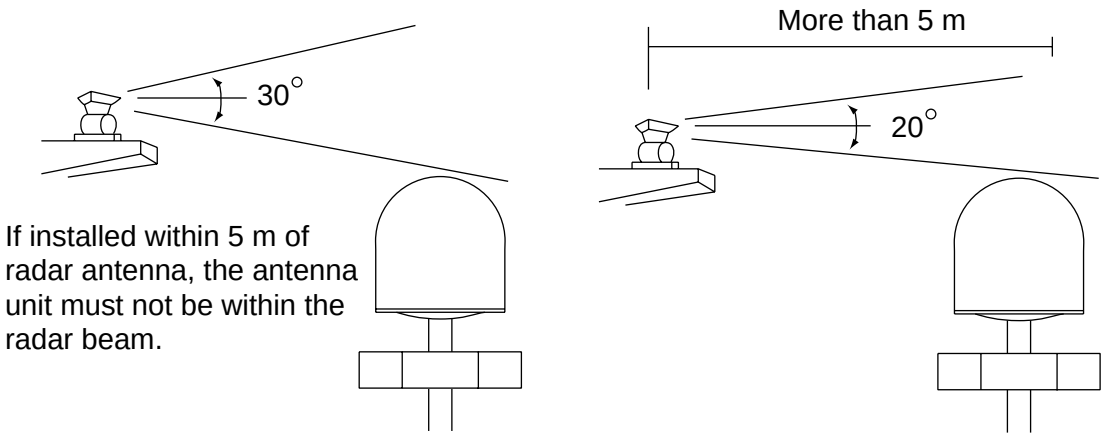

## Minimum distance from other antennas

***HF antennas, communication/navigation antennas:***

The FELCOM 70 antenna should be at least 5 meters from a HF antenna. VHF, satellite navigation antenna and other communication antennas should be at least 4 meters away.

***Radar:***

The FELCOM 70 antenna should be at least 5 meters away to protect the low noise amplifier in the radar antenna. However, if this distance cannot be secured be sure the FELCOM 70 antenna unit is not within the radar beam.




*Distance from antenna radar*

**Compass safe distance**

Locating the antenna unit too close to a compass can affect compass performance. The compass safe distance is 0.65 meters, steering compass, 0.30 meters, standard compass.

**Other mounting guidelines**

Other important mounting guidelines are

- Locate the antenna unit away from exhaust stacks (foreign material on the radome can interfere with reception and transmission).
- Keep the unit away from heat sources.
- Locate the unit away from places where fuels and chemical solvents are stored.
- Keep in mind the length of the cable from the communication unit is maximum 100 meters.

## 1.2 Designing antenna mast

**General**

To facilitate servicing, construct a mast more than 1 meter in height from the deck. The paragraphs which follow provide guidelines for selection and construction of the mast. Refer to the drawing at back of this manual.

**Guardrail, platform**

When the mast is tall, fit it with a guardrail and platform (or steps), for serviceman’s safety and convenience.

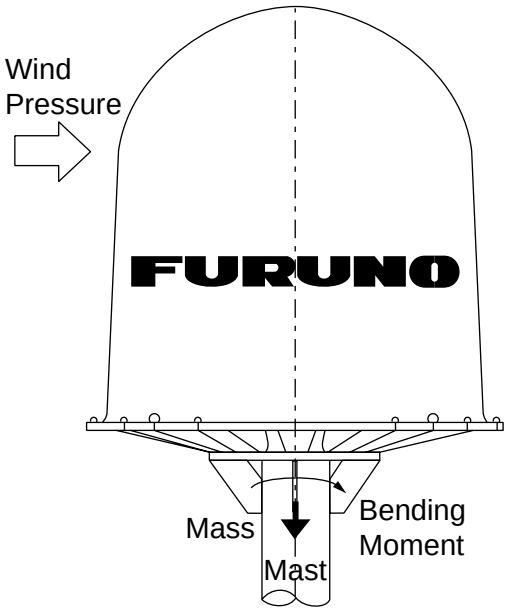
For servicing ease, the distance between hatch and the deck (or platform) to the antenna unit should be about 1 meter. (In most installations the serviceman stands on the platform while checking the radome. Thus this distance should be secured for ease of servicing.) The guardrail should be as high as possible for sufficient safety.

## Mast strength

The mast material must be sufficiently strong to meet the demands of the marine environment. It should satisfy the following requirements.

- It must be able to support radome mass plus at least 2.5 cm of ice and snow. Special consideration should be given if the unit is operated in areas of heavy snow or freezing temperature.
- Mast bending moment must be able to withstand expected maximum pitching, rolling and wind pressure.

To prevent resonance at low frequencies (about 5 Hz), four stays can be fixed between the mast and the mounting base.



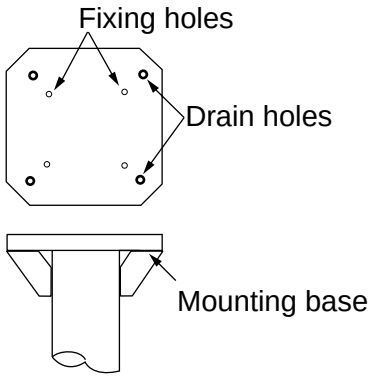

*Fixing radome*

| Item | Mass |
|---|---|
| Antenna unit mass | 65 kg ± 10% |
| Platform, guardrail mass | |
| Expected ice and snow | |
| Maximum wind pressure (at wind speed 75 m/s) | 2080 N |
| Maximum bending moment (at wind speed 75 m/s) | 1248 N•m |
| Maximum bending moment<br>(at wind speed 75 m/s, rolling angle 30 degrees) | 1440 N•m |
| Maximum bending moment<br>(at wind speed 75 m/s, rolling angle 30 degrees including 0.5 G speed added by rolling.) | 1630 N•m |

## Mounting base

A mounting base is installed between the mast and the antenna unit. Below are guidelines for installation of the mounting base.

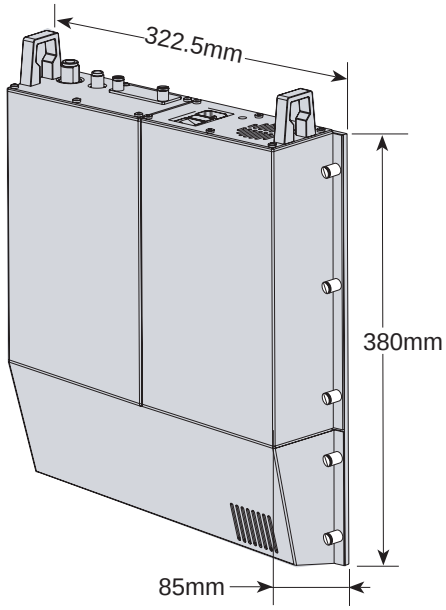
1. The face of the mounting base should be flat as possible (tolerance: within 2 millimeters of the horizontal plane).
2. The mounting base should be parallel with ship's horizontal plane (tolerance: ±1 degree).
3. The fixing bolts of the mounting base should be parallel with the ship's keel line (tolerance: ±2 degrees).
4. Weld a ground bolt (stainless steel, M10x40, local supply) to the mast within 50 cm of the ground terminal on the antenna unit. The length of the ground wire (supplied) is 50 cm.
5. Make four holes on the mounting base to face drain holes of the antenna unit.

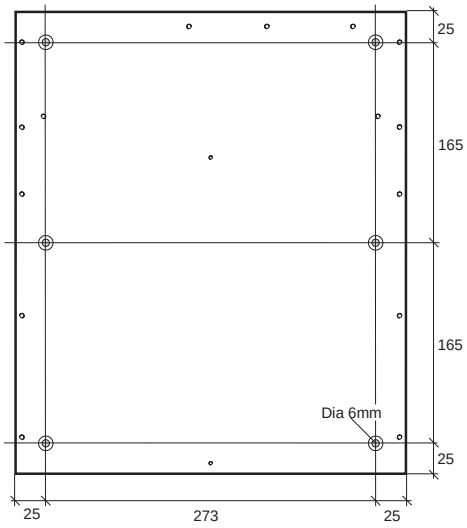



*Mounting base*

# 1.3 Physical characteristics of units

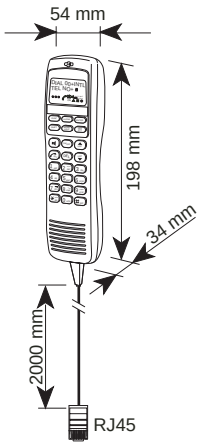
### Communication Unit (CU)




Mass: 7 kg

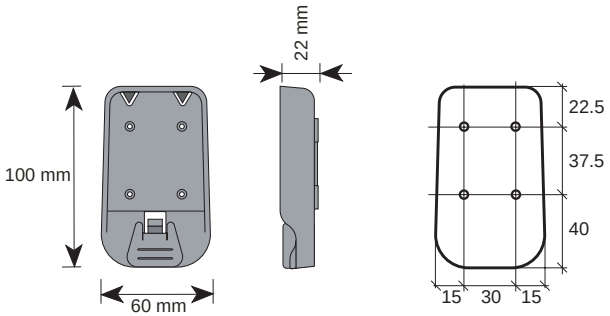
### ISDN Handset




Mass: 0.3 kg

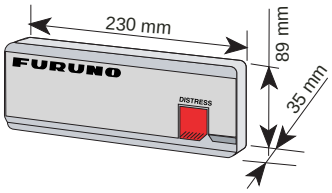
### Handset holder/cradle

(for ISDN Handset)



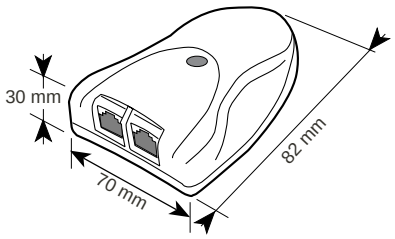

Mass: 0.06 kg

### Distress Alert Unit

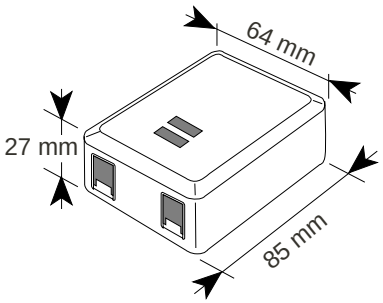


Mass: 0.24 kg

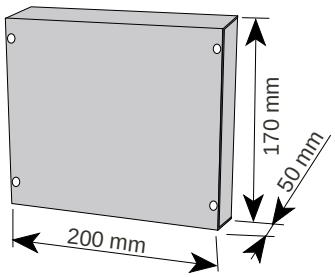
**ISDN wall socket (option)**

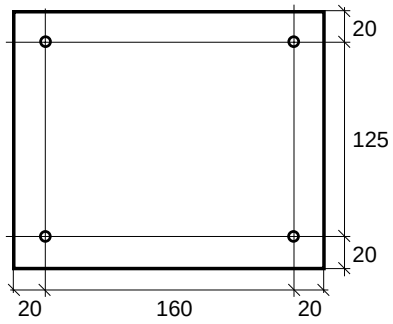



**Incoming indicator (option)**



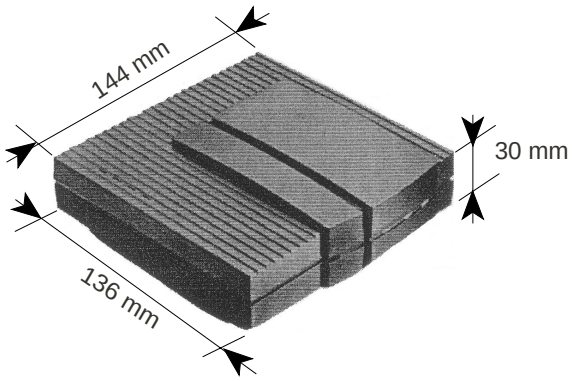

**Connection box (option)**



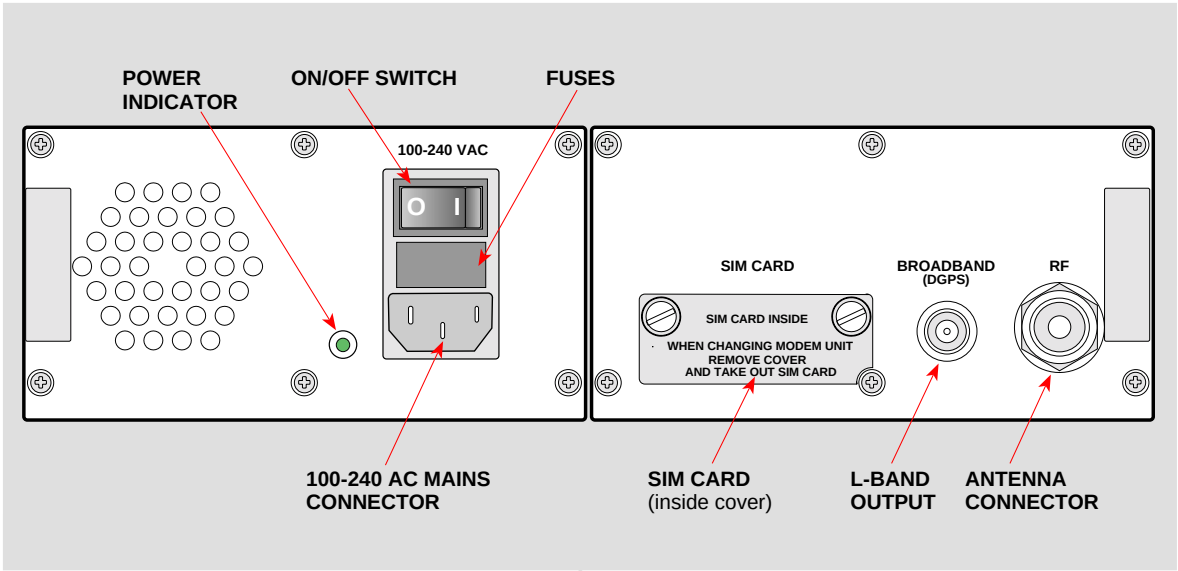

Mass: 0.6 kg

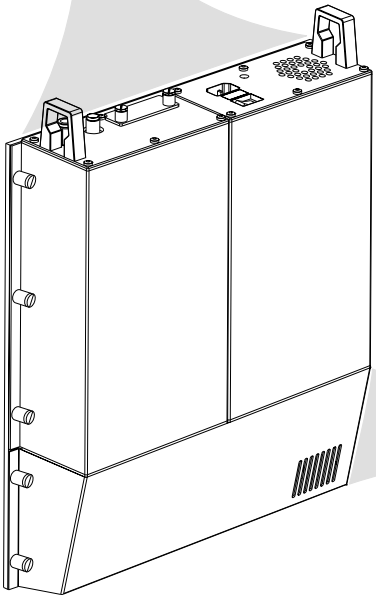
**Terminal Adapter (option)**



# 1.4 CU connectors

## Upper connector panel

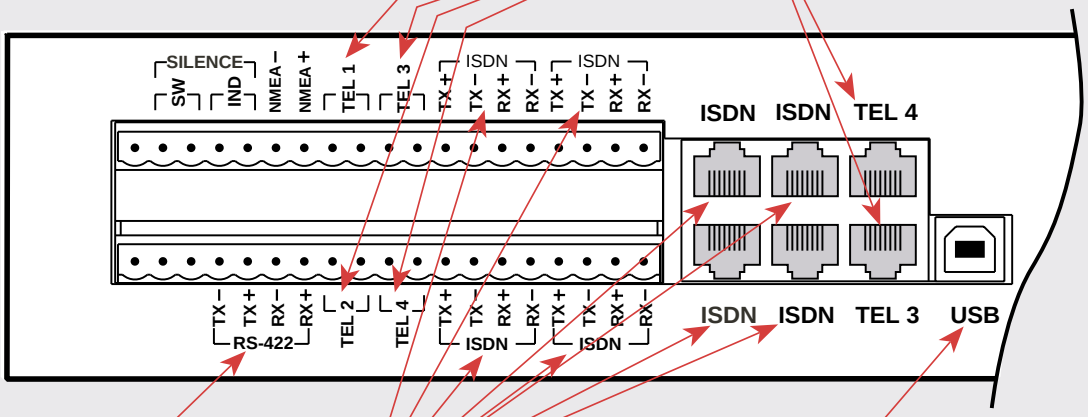


*For lower panel, see next page*

## Lower connector panel

**Screw terminal blocks TEL 1 - 4,** and **RJ45 connectors TEL 3 - 4:**
Connection of 2W analogue telephones and G3 fax



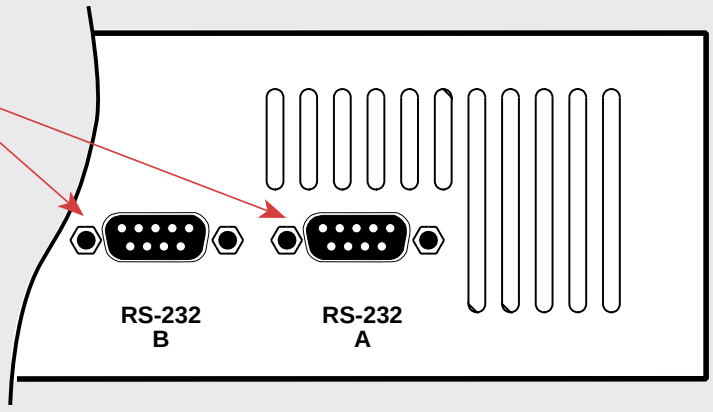

**RS-422:**
serial port for connection of data equipment with up to 100 metres cables.

**ISDN:**
Connectors/RJ45
Services:
- 4.8 kbps compressed speech
- 64 kbps speech
- 64 kbps data service (UDI)
- 56 kbps data service (V110)
- 64 kbps audio service (3.1 kHz)

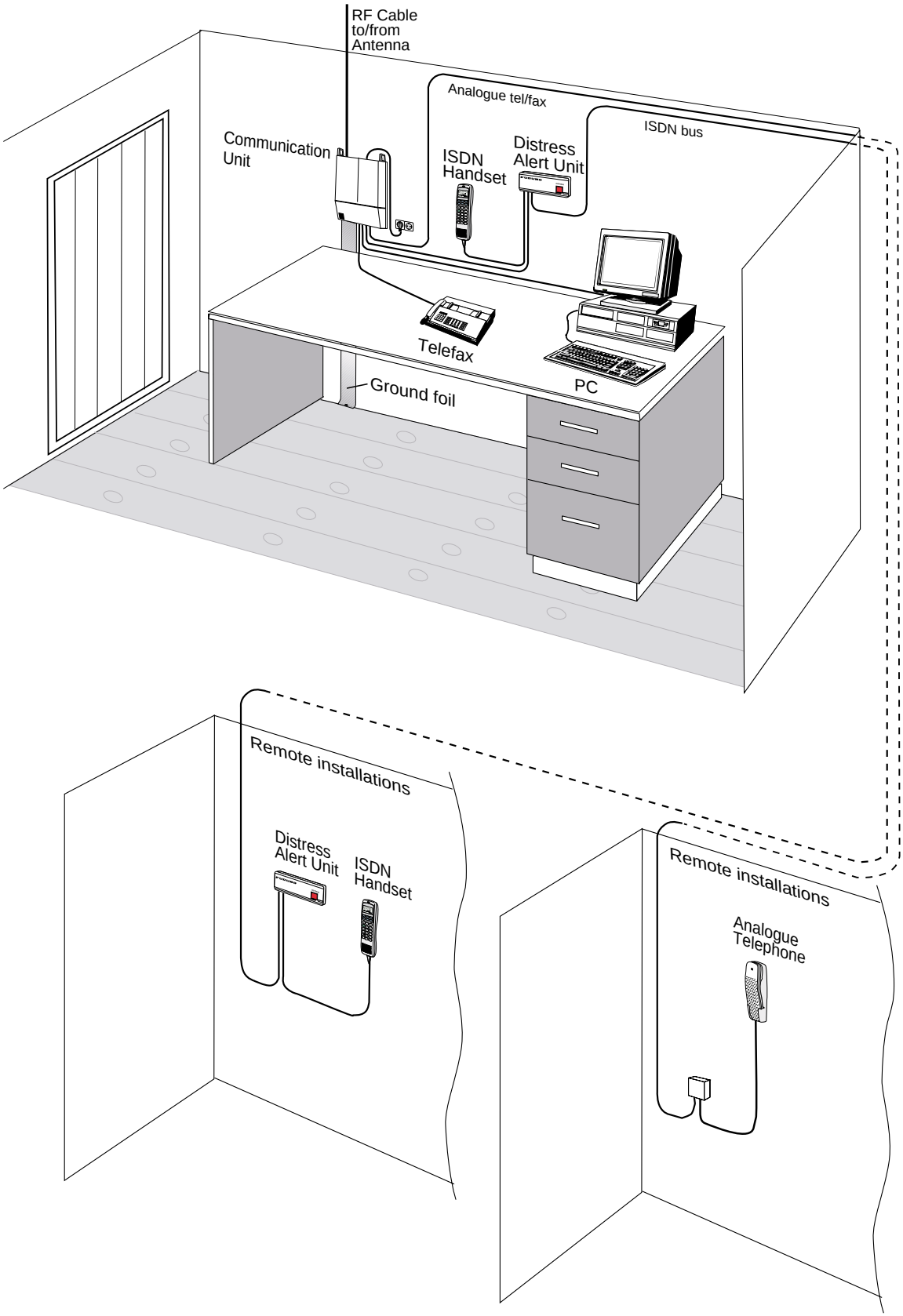
*Note! Use shielded ISDN cable*

**USB:**
serial data port for:
- operation and configuration from PC.
- 64 kbps data service (UDI)
- MPDS

**RS-232:**
9-pin serial data ports for:
- operation and configuration from PC.
- software download
- 64 kbps data service (UDI)
- MPDS

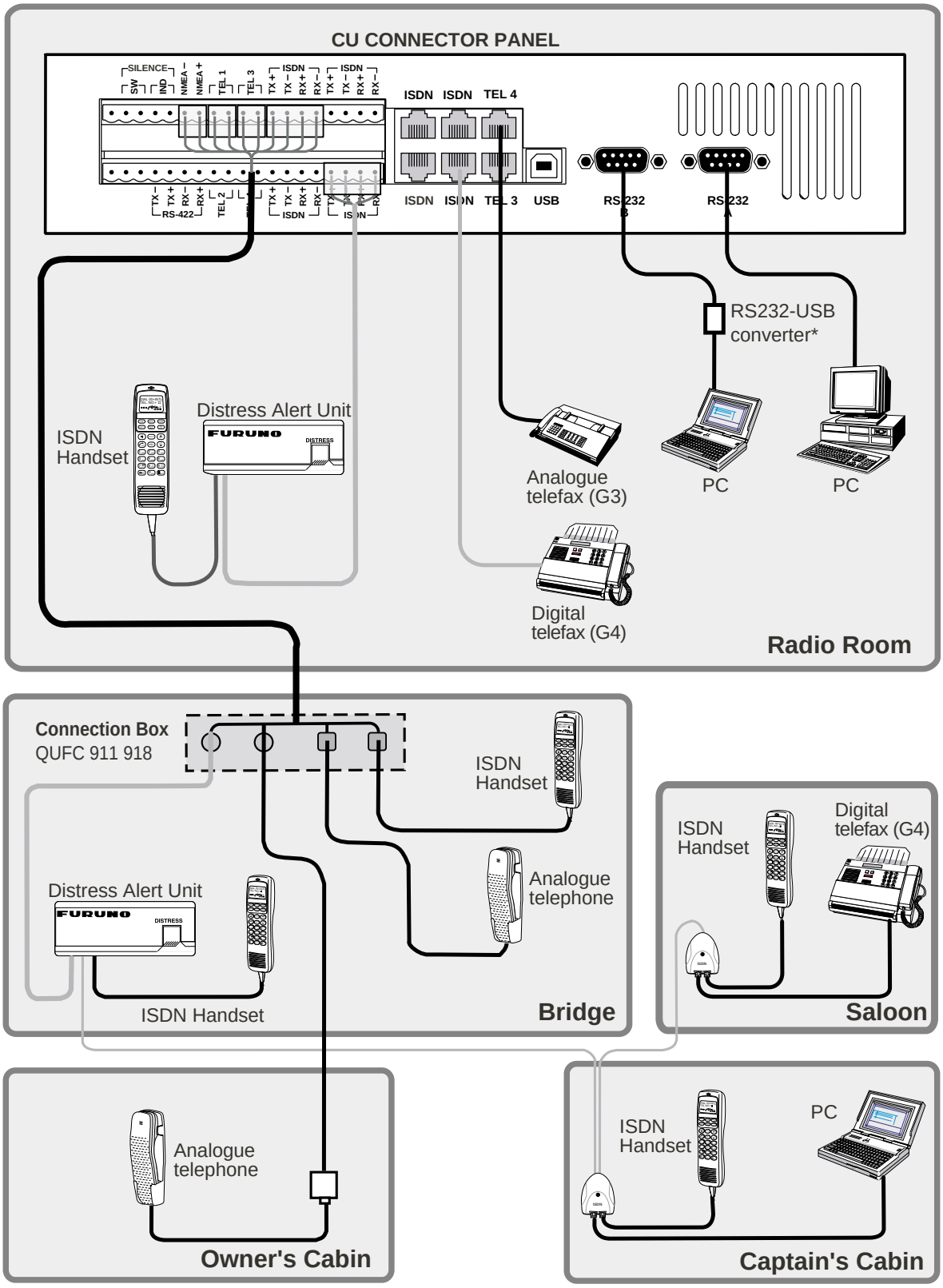


# 1.5 Example of installation



## Example of cabling arrangement

The installation includes five ISDN Handsets (two w/Distress Alert Unit), Group 3 and 4 telefaxes, PC w/printer, Data Equipment and two Analogue Telephones.

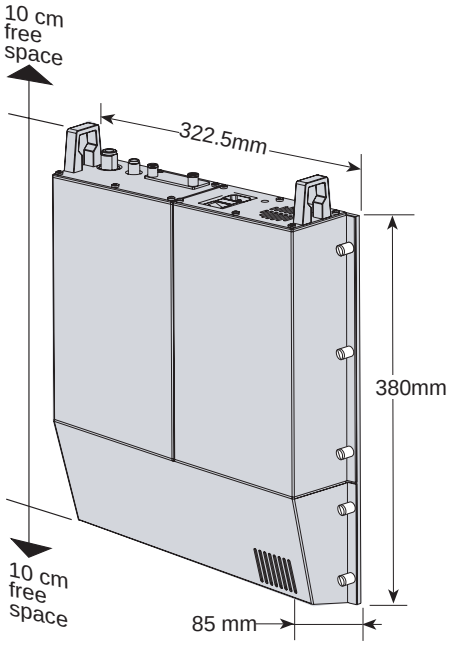



*: Recommended RS232-USB Converter : USB-RSAQ2 by I-O DEVICE INC.

# 1.6 Placing units

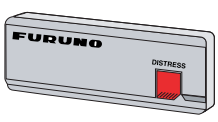
## Placing the Communication Unit (CU)

The Communication Unit should be placed in a ventilated area. To ensure adequate cooling of the CU a 10 cm unobstructed space must be maintained above and below the unit.
A space of 10 cm above the CU is also required to allow removal of units.
*For grounding, see **"1.7 Grounding considerations**" on page 14 and **"Location and grounding of units**" on page 23.*
Ambient temperature range 0° - 45°C.
The CU is manufactured as a cabinet for wall or desktop installation with dimensions as shown. Six holes through the CU mounting plate allows the unit to be secured to the wall or desk top.




## Placing the Distress Alert Unit & ISDN Handset

The Distress Alert Unit is operated in conjunction with an ISDN Handset.
The ISDN Handset functions as a display and communication unit for alert transmission.
It may also be used for normal voice communication.
Up to two (2) Distress Alert Units & ISDN Handsets may be connected in series. The units may be installed anywhere onboard the vessel.
Four separate ISDN ports are available on the CU as RJ45 jacks or screw terminal blocks.
Max cable length: 100 m, 4 x 0.22 $mm^2$ .
*See **"ISDN telephones/equipment"** on page 34.*



## Placing the ISDN Handset as a standard telephone

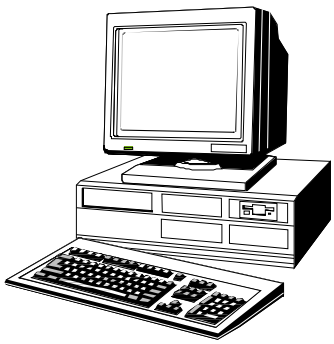
The ISDN Handsets may be installed as standard telephones. The units may be installed anywhere onboard the vessel.
Four separate ISDN ports are available on the CU as RJ45 jacks or screw terminal blocks.

## Placing the telefax (option)

A digital telefax (Group 4) can be connected to one of the ISDN outlets, or to an ISDN bus for transfer at 64 kbps rate.
An analogue telefax (Group 3) should be connected to the FAX (GR3) outlet, providing up to 28.8 kbps transfer speed.

## Placing the PC (user supply)

A PC w/ISDN card can be connected to one of the ISDN outlets, or to an ISDN bus for 64 kbps rate data communication for installation up to 100 m away from the CU.
With the PC connected to the USB/RS-232/RS-422 port it can also be used for control and configuration of the Communication Unit.
This requires that the vtLite Marine program accessible on the FELCOM 70 CD is installed.
Connection to the USB/RS-232/RS-422 port also allows 64 kbps data transmission.
*See the User Manual.*

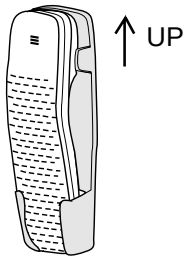


Cable lengths:

- ISDN port: *See **"ISDN telephones/equipment"** on page 34.*
- USB port: 3 m
- RS-232 ports: 3 m
- RS-422 port: 100 m

### Placing analogue telephones (option)

Analogue 2-wire telephones can be installed anywhere onboard the vessel.
Four separate analogue ports TEL1-TEL3 and FAX (GR.3) are available on the CU.
TEL3 and FAX (Gr.3) are in addition available as RJ45 jacks.
The analogue telephone DBAR 104001/888 (option) should be installed on a bulkhead.




## 1.7 Grounding considerations

A successful installation of a maritime satellite terminal must take into account the noisy environment in which the equipment shall operate.

**Electrical noise**

The electrical environment on board a ship is usually quite noisy.
Powerful electrical installations cause voltage variations and transients, as well as low and high frequency noise. Radio and radar equipment radiate radio frequency signals which frequently impregnate cables on board with unwanted interference.

**Ground plane**

Most ships have a steel hull. One should think that the steel construction of the ship would constitute a good ground plane.
This is often not quite true. Rust, other forms of corrosion, paint and grease, often prevent a good ground connection. A consequence of this is that high energy power distribution on board a ship can cause significant ground potential differences.

**Antenna unit**

***Adequate grounding of the Antenna Unit depends on the fastening bolts making good contact with the top flange of the mast. This is obtained by removing paint and using enclosed toothed washers and nuts.***

**Antenna cable**

The antenna coaxial cable normally has a solid or meshed metal screen which must be terminated to ground both at the antenna pedestal and at the CU. The length of the cable can often be more than 40 metres. If the ground potential level at the two points differ, the current passing through the screen of the coaxial cable can be quite strong. The antenna cable screen constitutes a heavy gauge wire, which is capable of conducting large amounts of current.

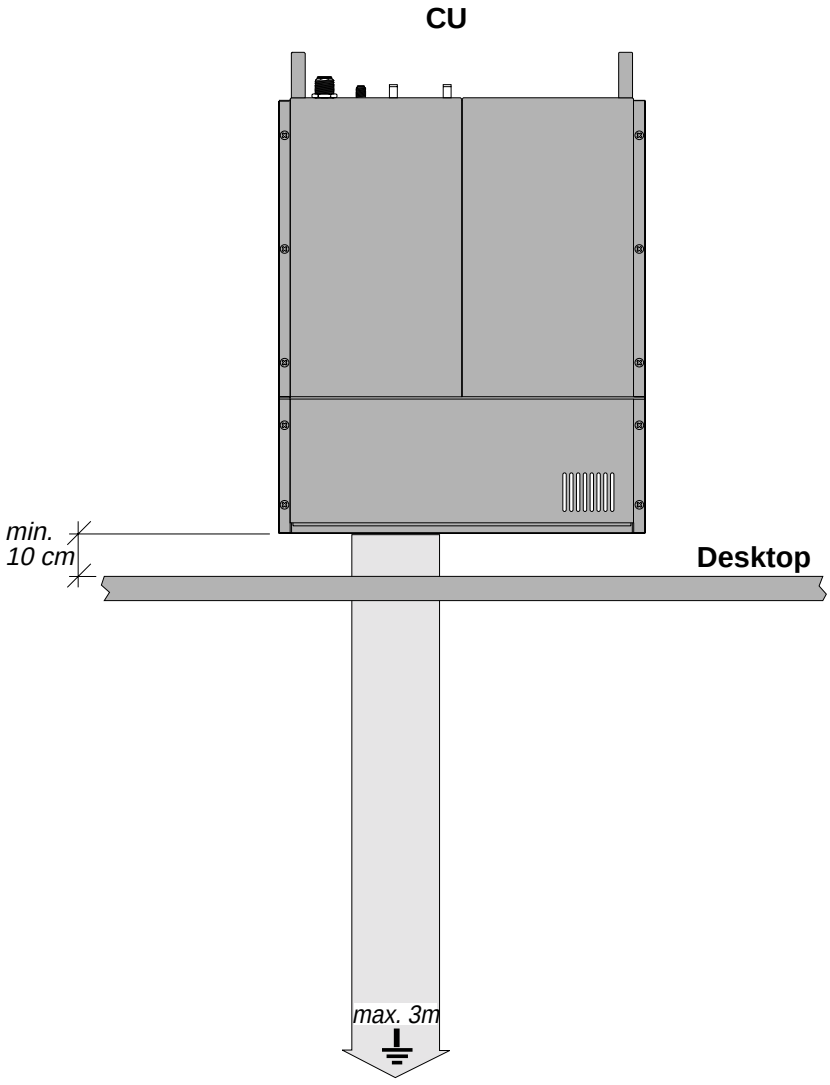
## Below Deck Equipment

The CU must be provided with a good electrical connection to the ship's hull for grounding. This is obtained by using *copper foil*. *(See Installation:* ***"Location and grounding of units"*** *on page 23.)*
Length of copper foil/10 cm should not exceed 300 cm. The foil should be connected to ship's hull (deck or roof) by hard-soldering (or screws) to steel.

## Mains power/ground

Mains ground is secured to the common grounding point through the external supply. It is therefore important to use the same mains branch for additional equipment connected to the CU (Fax, PC w/printer etc.).

*Location of the Below Deck Unit for best possible grounding.*
*See also INSTALLATION:* ***"Location and grounding of Units"*** *on page 23.*



# 1.8 Laying cables

**General**

The coaxial cable for connection between the CU and the Antenna Unit should, if possible, be laid before the equipment arrives. Make sure sufficient length of cable is ordered.
Where exposed to mechanical wear (on deck, through bulkheads etc.), the cable should be protected by steel pipes.
Standard procedures should otherwise be followed for cabling in ship installations.
Special attention to existing safety regulations is required if the cable passes through zones where there may be flammable or explosive gases. Use suitable gasproof cable glands or bushings.

**At the Antenna Unit**

A free end of approximately 1.5 m of the antenna cable above the radome bottom should be provided for connection to the coaxial connector in accordance with the installation instructions in ***"Connecting the antenna cable to the CU"*** *on page 28.*

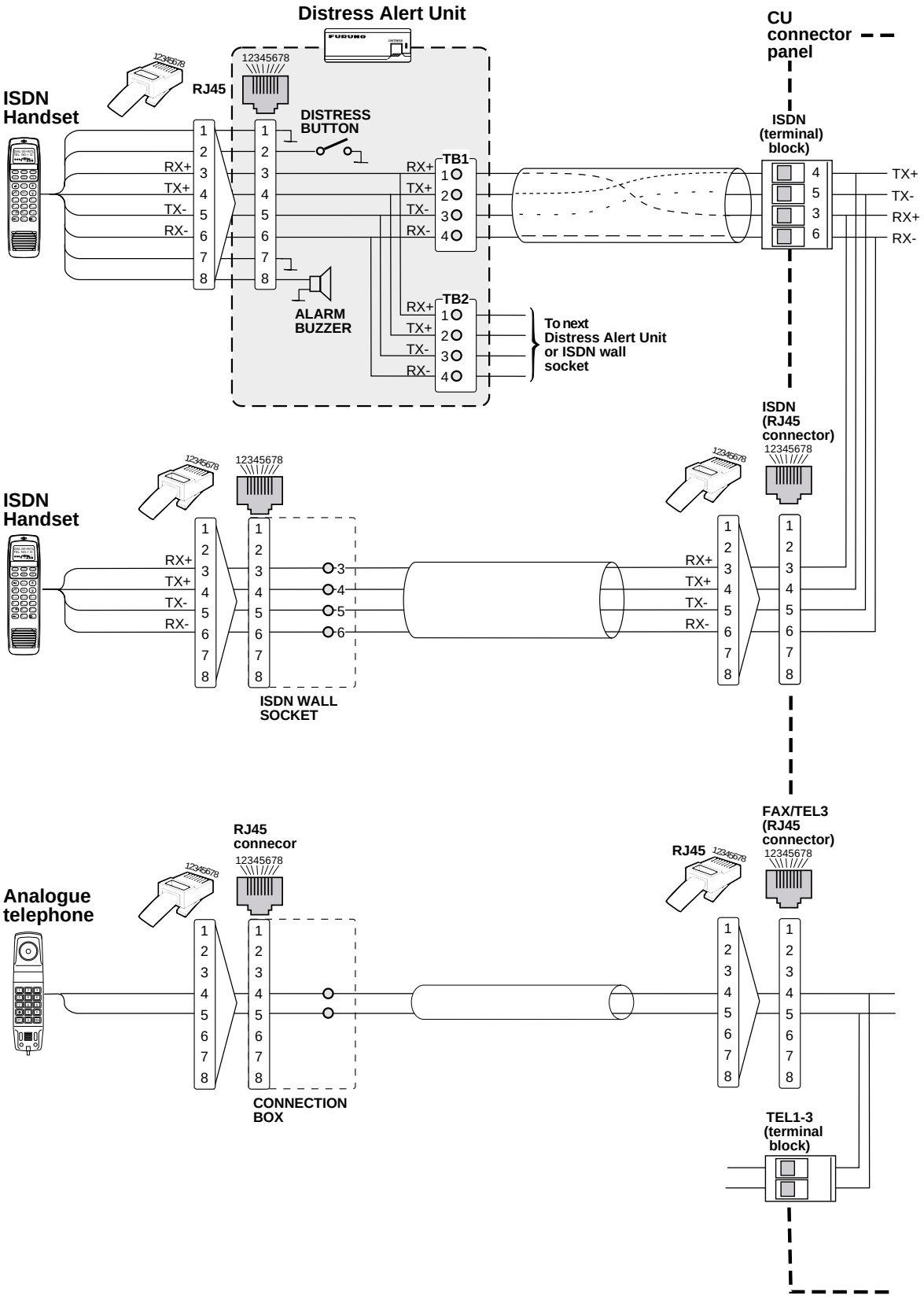
**At the Communication Unit**

The coaxial cable from the Antenna Unit should be given a free end of approximately 0.5 m at the CU location.

**ISDN Telephone, Distress Alert Unit, telefax or analogue telephone**

Choose the position for the required wall sockets and lay the cables leaving a free end of 0.5 m. Also allow a free end of 0.5 m at the Connection Box.

# 1.9 Telephone wiring



# 2. INSTALLATION

Open all boxes supplied and check the contents with the enclosed packing list. Inspect units and parts for possible transport damage.

## 2.1 Installing the Above Deck Equipment (ADE)

**Unpacking**

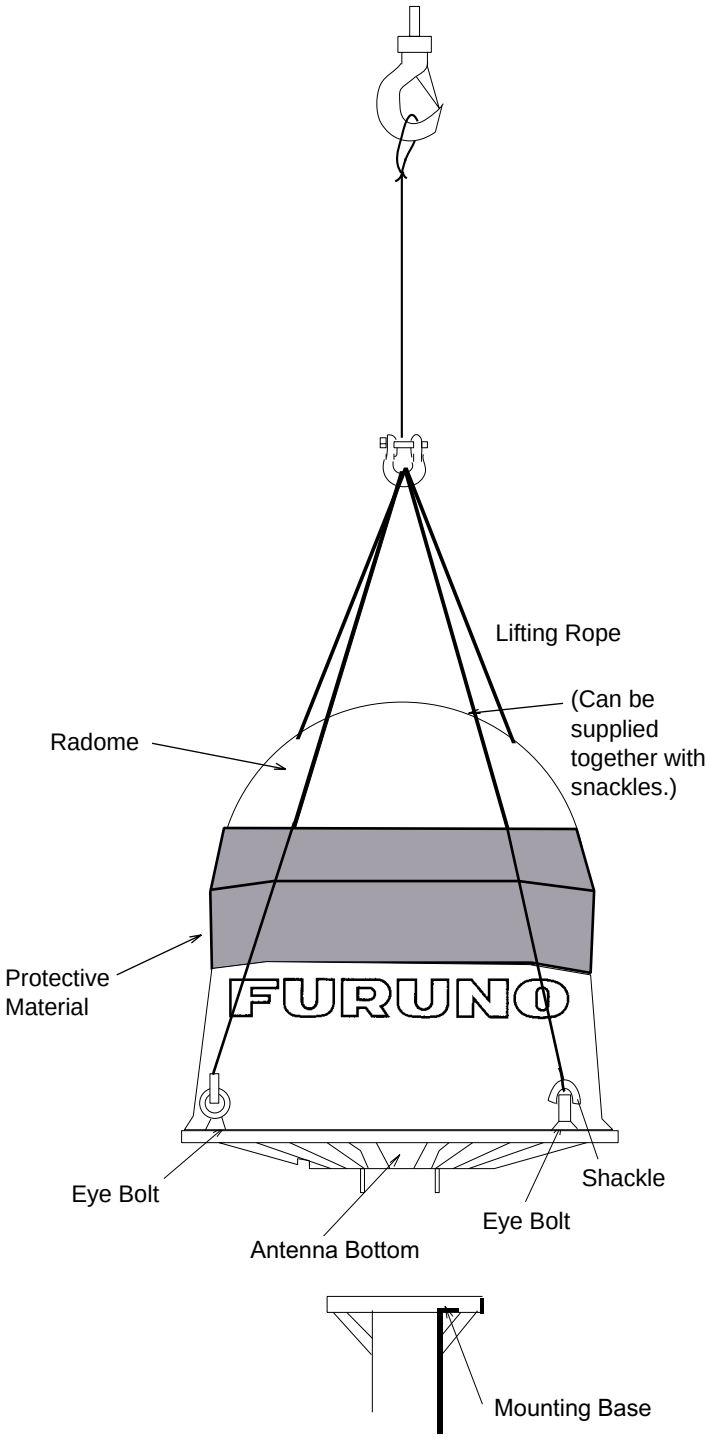
- Check that if the antenna unit is damaged by shipment.
- Unpack the antenna unit carefully so as not to damage it.

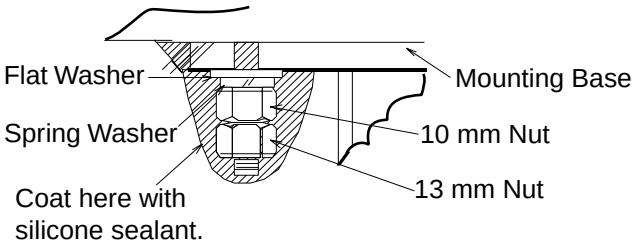
Remove hex nut, spring washer, flat washer, large washer and fixing material to dismount the antenna unit. This hardware can be discarded.

**Mounting procedure**

See next page for illustration

1. Run lifting rope through eye bolts and shackles.
2. Cover the portion of the radome which contacts the lifting rope with protective material (rubber mat, etc.), to prevent damage to the radome when hoisting it to the mounting location.
3. Hoist the antenna unit to the mounting location.
4. Fix the antenna unit to the mounting base (see note on next page) with nuts, keeping in mind hatch direction (standard direction is stern).
5. If necessary, replace eye bolts with hex. bolts (supplied).
6. Coat all bolts and nuts with silicone sealant to prevent electrolytic corrosion.




FIXING OF RADOME

**Note:** Do not use a rubber gasket on the mounting base. The face of the mounting base should be flat as possible (tolerance: within 2 mm of the horizontal plane).
If tolerance is more than 2 mm, insert a metal spacer between the antenna bottom and the mounting base. For earth wiring, see Chapter 2.

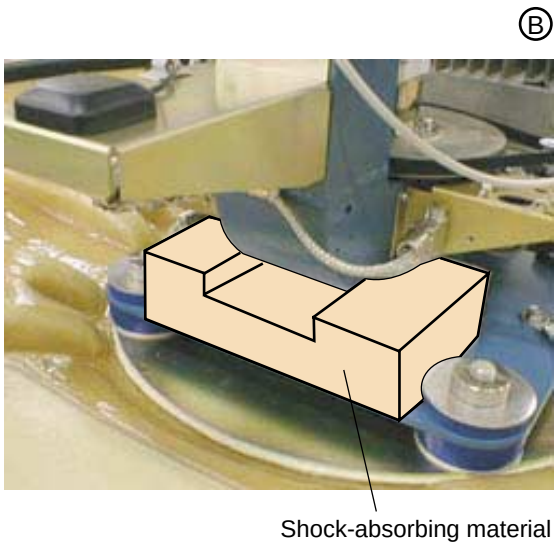
## Attach electromagnetic wave caution label

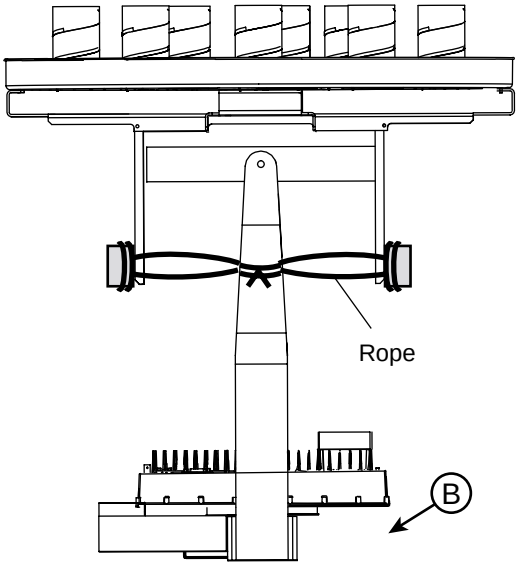
The label which warn of electromagnetic waves is supplied with the installation materials. Attach it, considering to the following points.

- To the radome mast where it can easily be seen.
- In a conspicuous location in the stairwell leading to the deck where the antenna unit is installed.

## Removing ropes

The stabilizer in the radome is tied by the rope and shock-absorbing material to prevent damage to it during shipment and installation. Cut and remove them after finishing the installation.

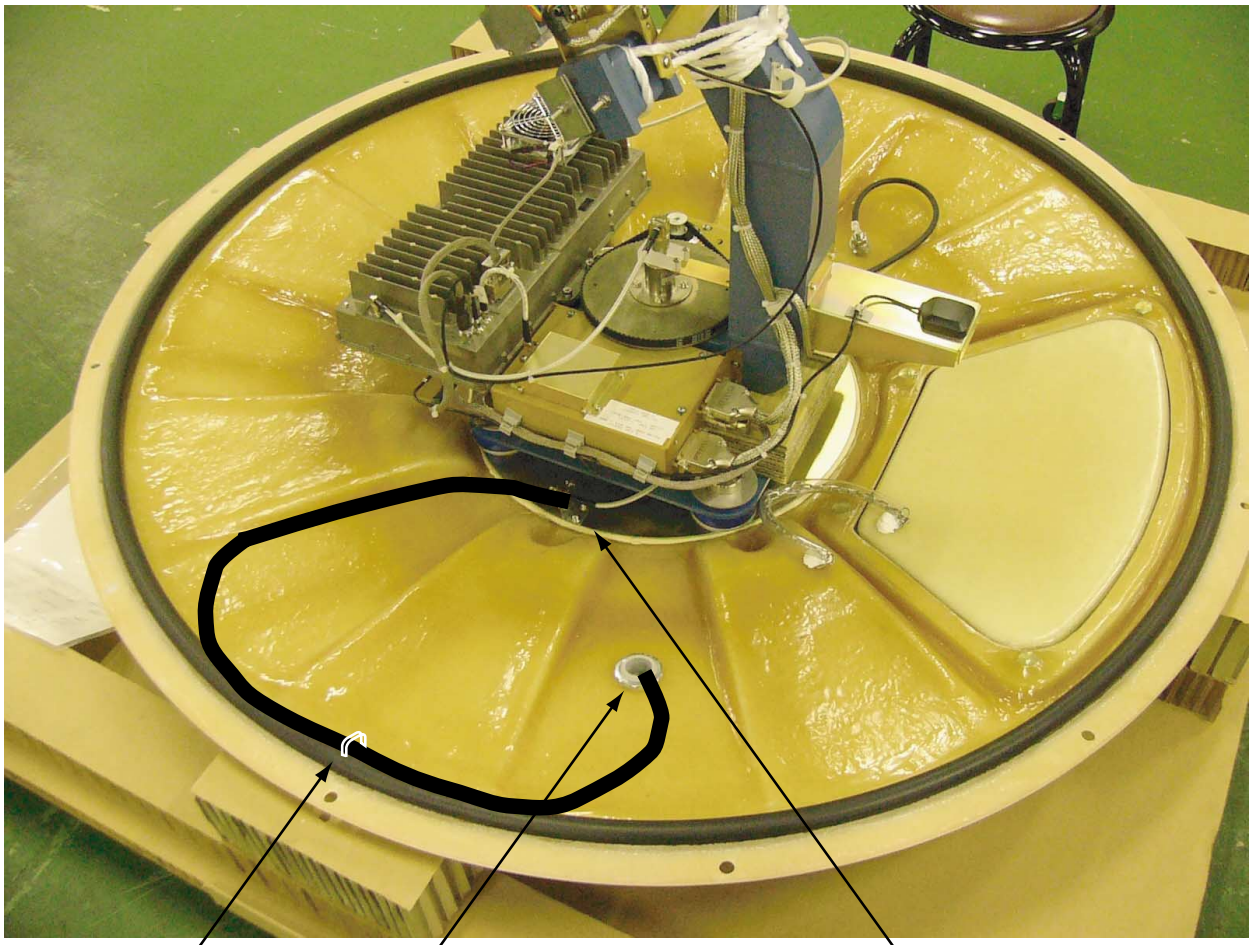


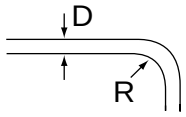
# 2.2 Connecting antenna cable to ADE

## ADE - Connecting antenna cable to Mast Mounted Antenna

**1** Lead in the antenna cable 1100 mm from the cable entry in the antenna base.
**2** Fix the cable with cable clamp.
**3** Connect the coaxial connector and secure it by the cable gland.




**Note:** Bending radius “R” can be $R \geqq D \times 10$, where as “D” is a diameter of coaxial cable.



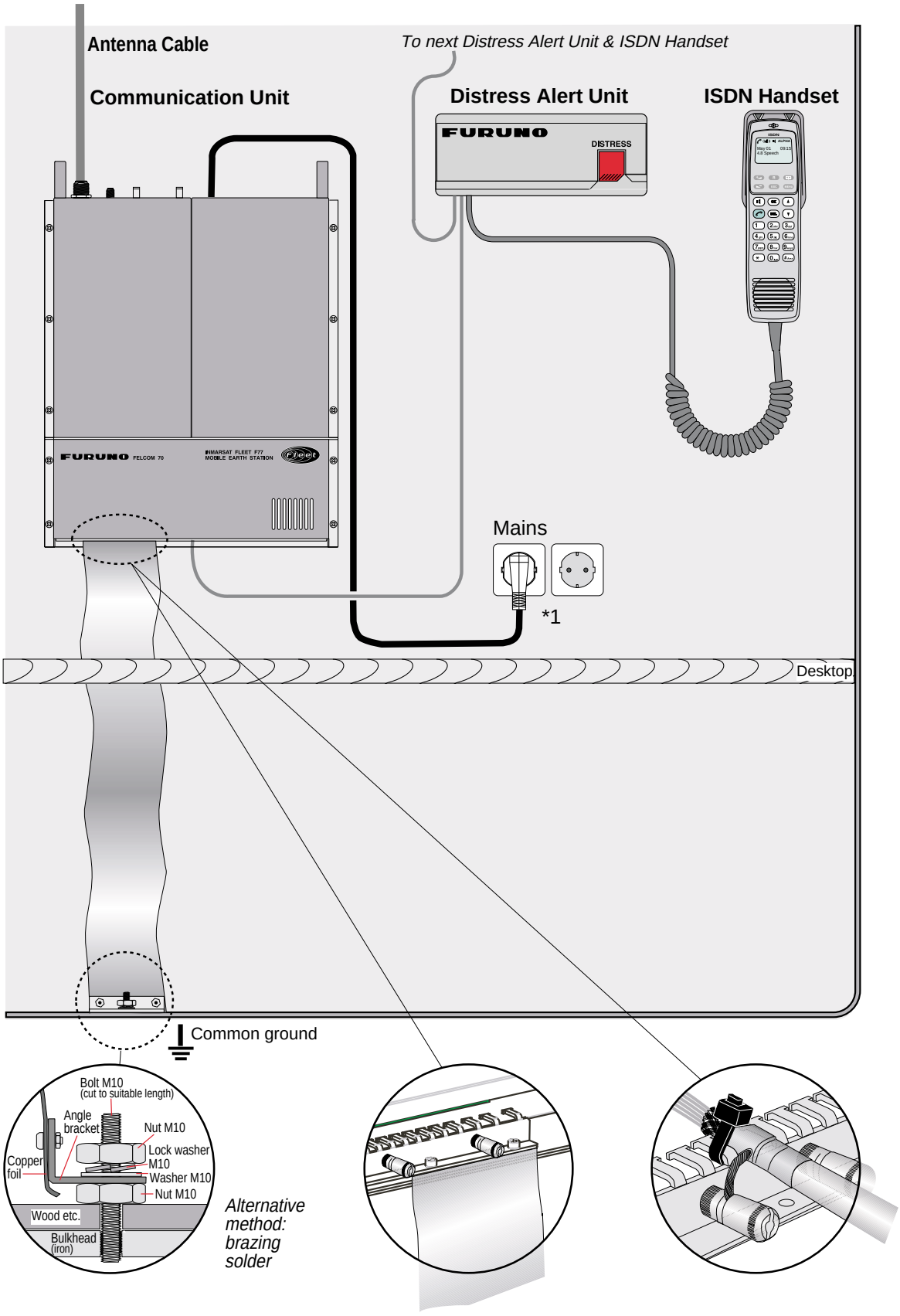

$R \geqq D \times 10$

## ADE - Connecting coaxial cable to Deck Mounted Antenna

Deck mounted antenna unit is under development.

# 2.3 Installing the Below Deck Equipment (BDE)

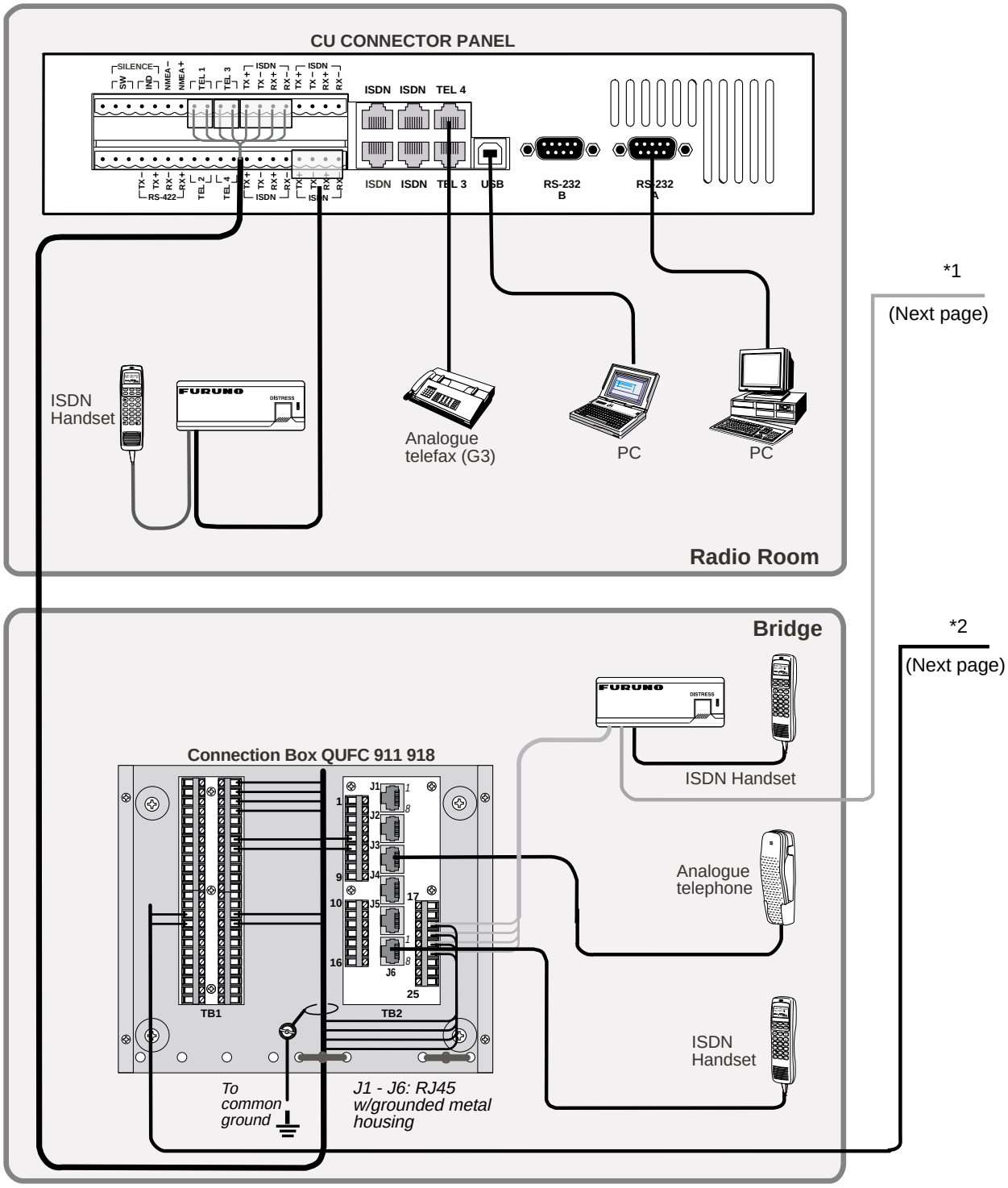
## Location and grounding of units




*1: If the AC plug is not mated to a ship's jack, cut the plug and connect to the ship's mains, using a junction box (shipyard supply).

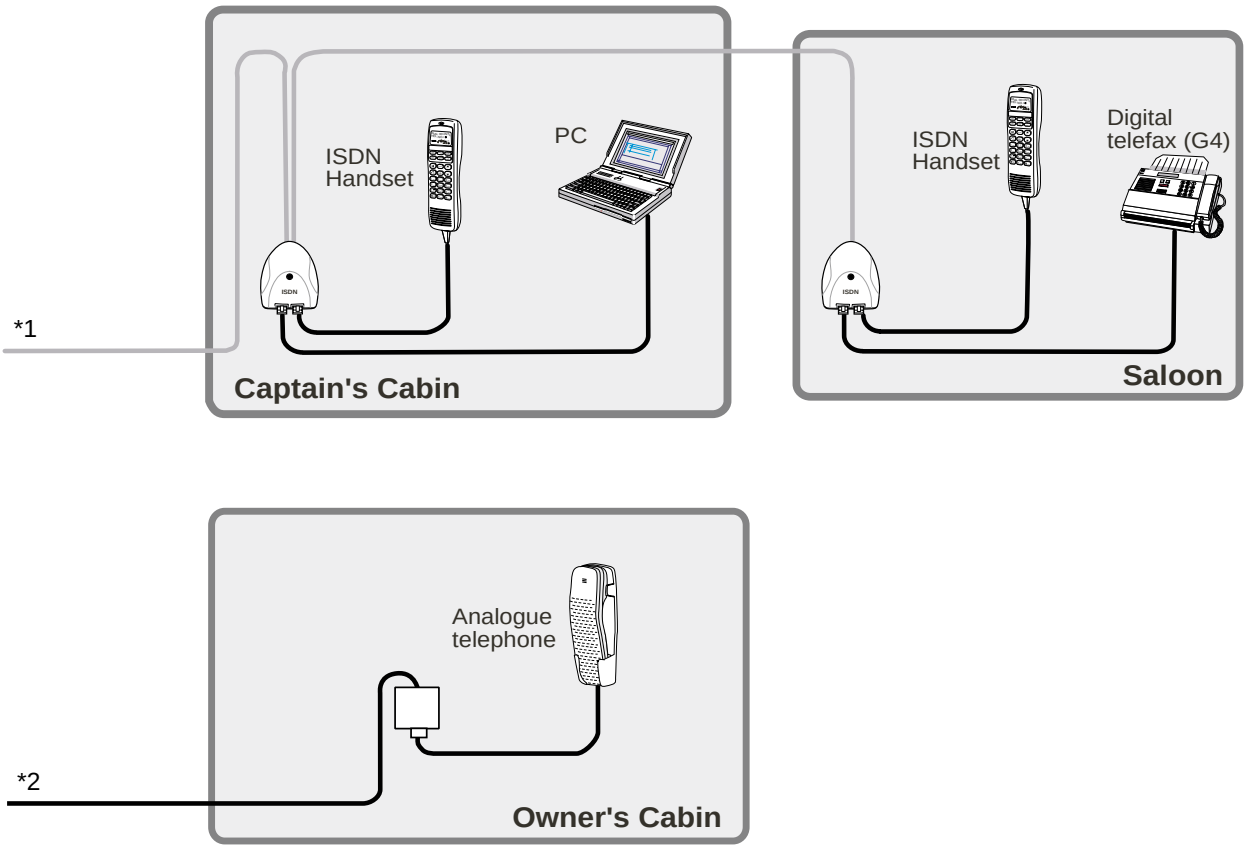
## BDE - Example of local or near-by installation

The installation includes five ISDN Handsets (two w/Distress Alert Unit), Group 3 and Group 4 telefaxes, PC and two analogue telephones.



## BDE - Example of remote installation

The installation includes two ISDN Handsets connected to the ISDN bus via wallboxes with two 8-pin RJ45 jacks and analogue telephone.

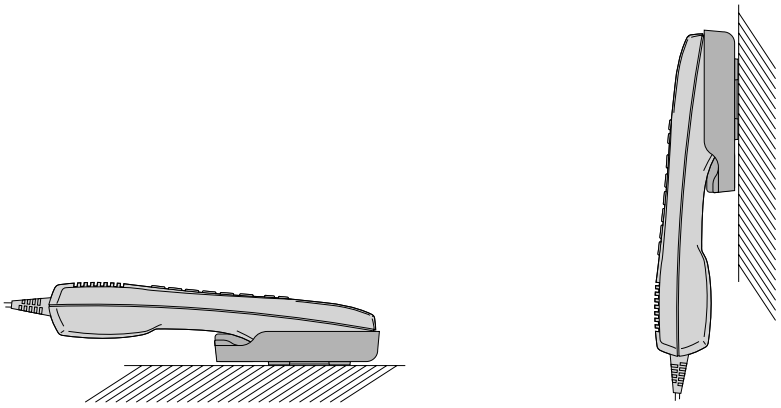



## ISDN Handset

The ISDN Handset is to be plugged into the **ISDN** socket located on the connector panel of the CU, or to the Distress Alert Unit (if installed).
**Note:** It is not recommended to extend the handset cable by more than 6 m.

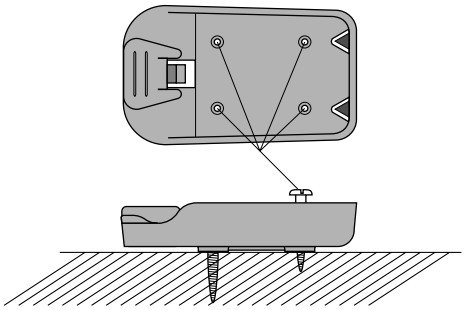
## Handset holder/cradle

The handset holder/cradle may be desk mounted or wall mounted.

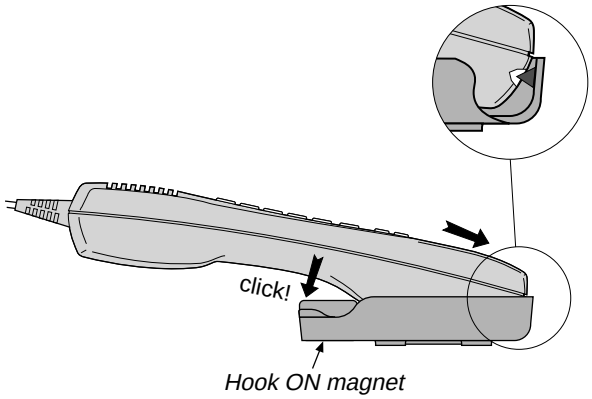


*Desk mounted* *Wall mounted*

Attach the holder to the wall or desktop with four 4 mm wood screws or tapping screws.

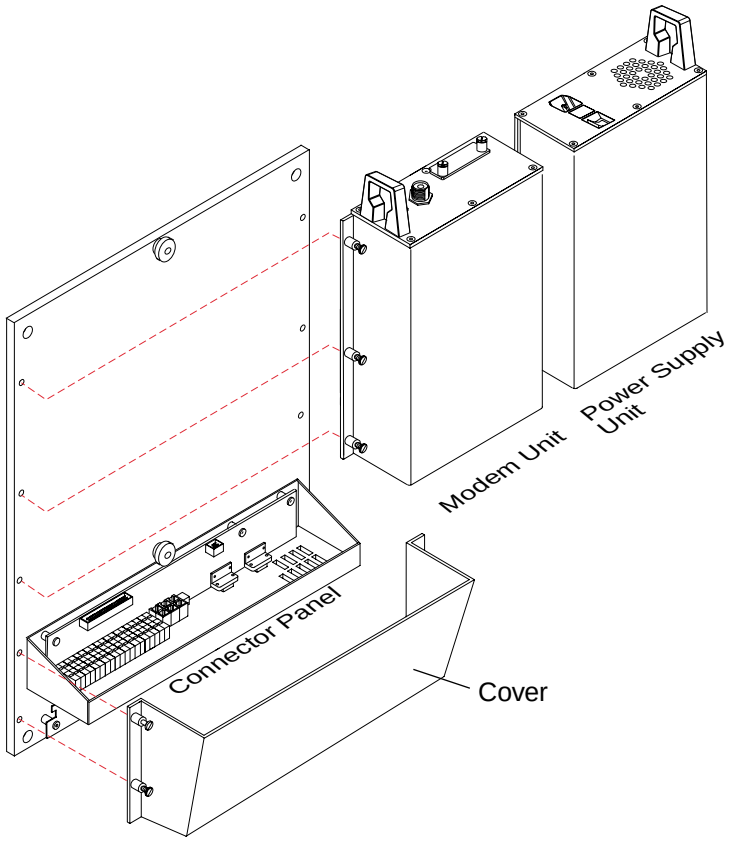


Place the Handset on the holder as shown.

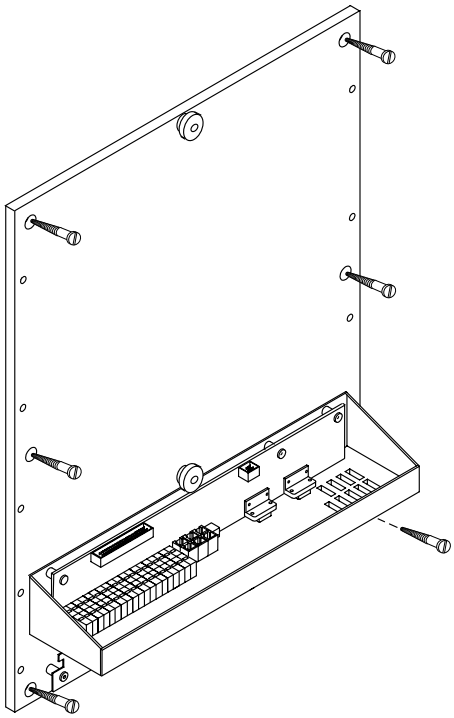


## Mounting the Communication Unit (CU)

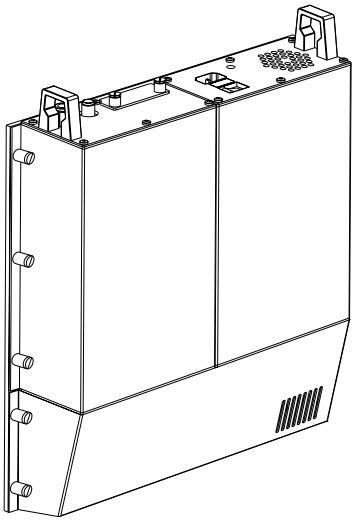
**1** Unscrew the Power Supply Unit and the Modem Unit and pull them carefully out. Remove the cover protecting the connector panel.




**2** Attach the bottom plate to the wall using six wood screws or tapping screws.
*Ensure a free space above and below the CU of at least 10 cm for adequate cooling, and to allow removal of the Modem Unit and Power Supply Unit.*

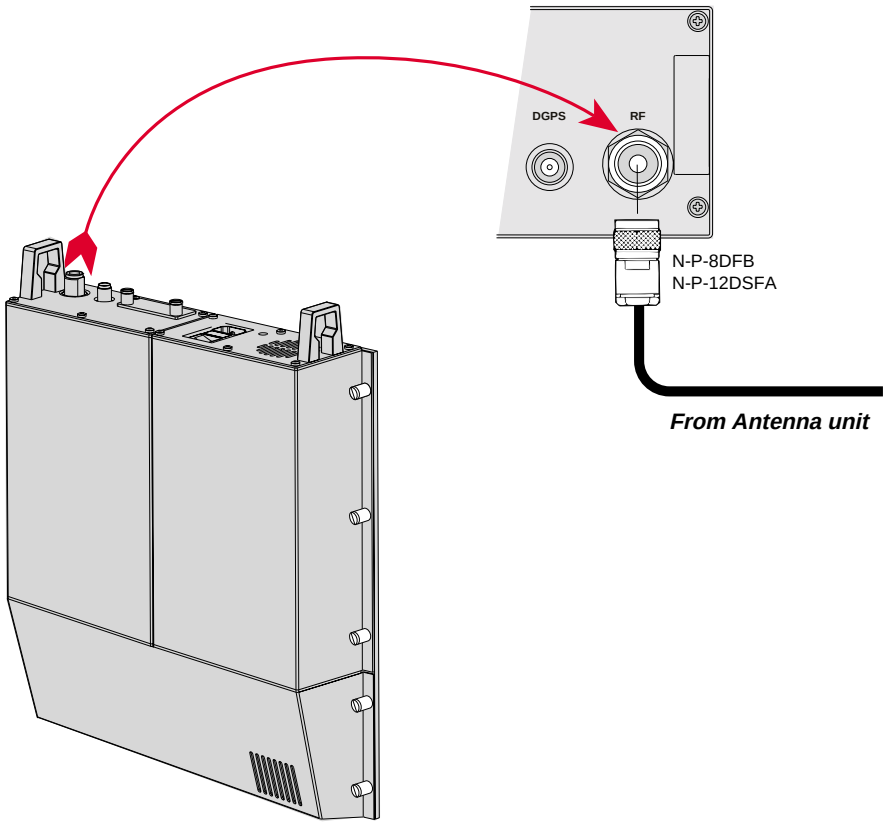


**3** Mount the Power Supply Unit and Modem Unit. Remount the connector panel cover after connection of cables.



## Connecting the antenna cable to the CU

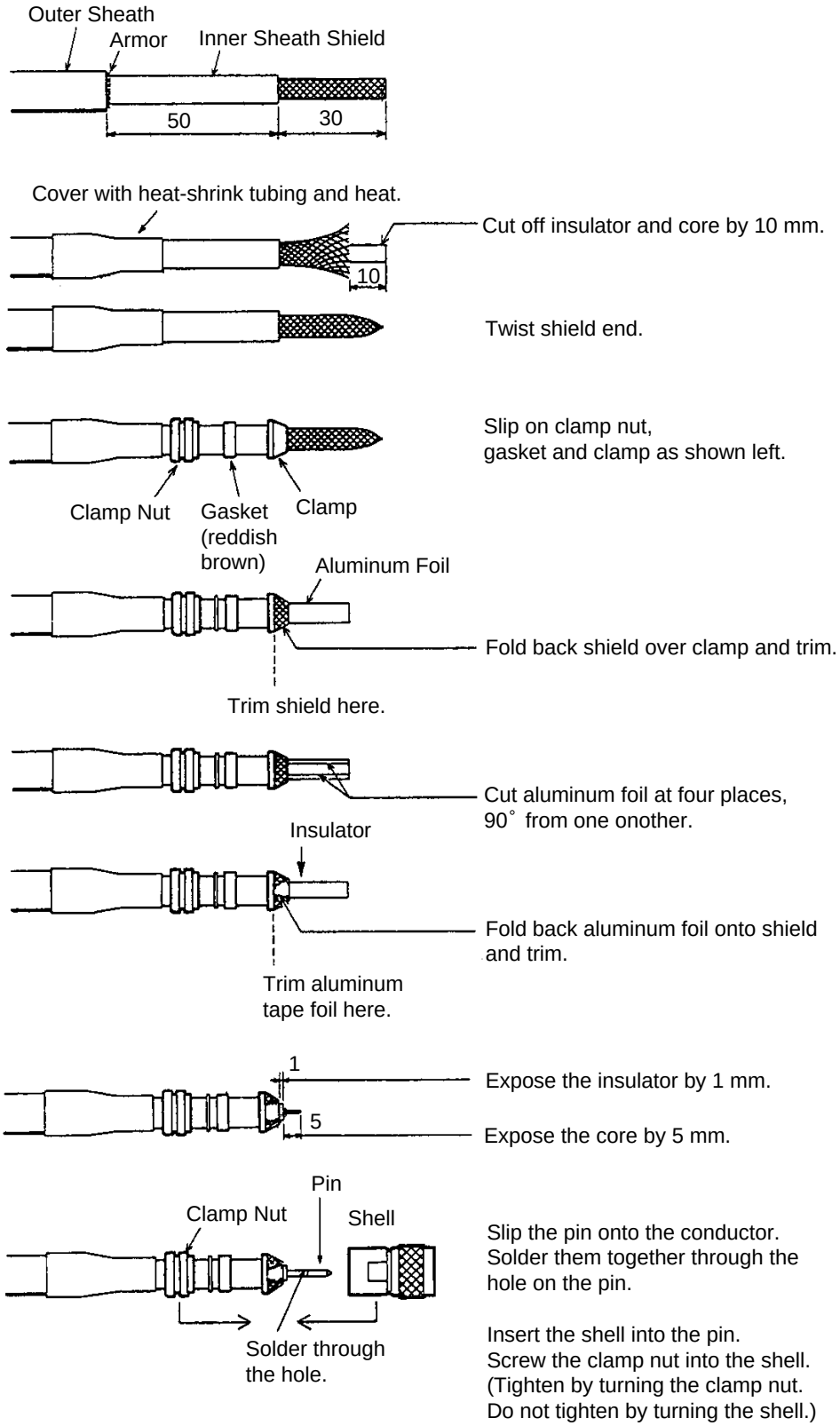
**1** Strip the Antenna coaxial cable leaving sufficient slack for connection to the CU.
**2** Mount the N-plug on the cable in accordance with the instructions *(see next pages)*.



**N-P-8DFB connector**

Fabricate the antenna cable as shown below to connect the antenna cable to the communication unit.

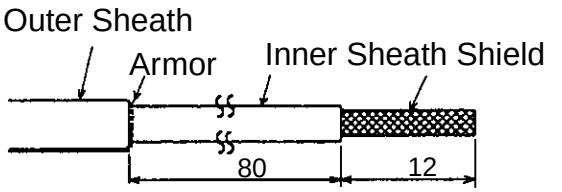
(Dimensions in millimeters.)



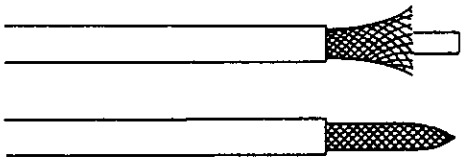

*How to attach the antenna cable connector N-P-8DFB*

**N-P-12DSFA connector**

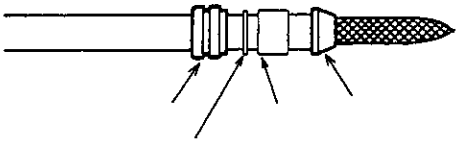
(Dimensions in millimeters.)



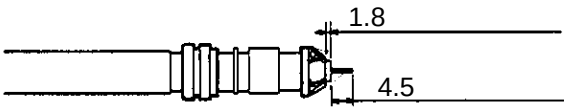

Remove outer sheath and armor by the dimensions shown left.
Expose inner sheath and shield by the dimensions shown left.



Twist shield end.

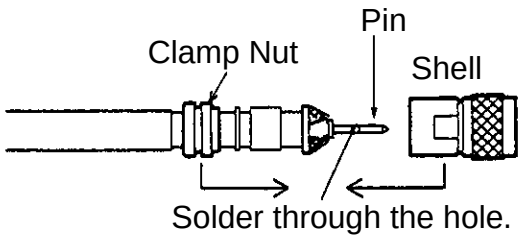


Slip on clamp nut, gasket and clamp as shown left.




Expose the insulator by 1.8 mm.

Expose the core by 4.5 mm.




Slip the pin onto the conductor.
Solder them together through the hole on the pin.

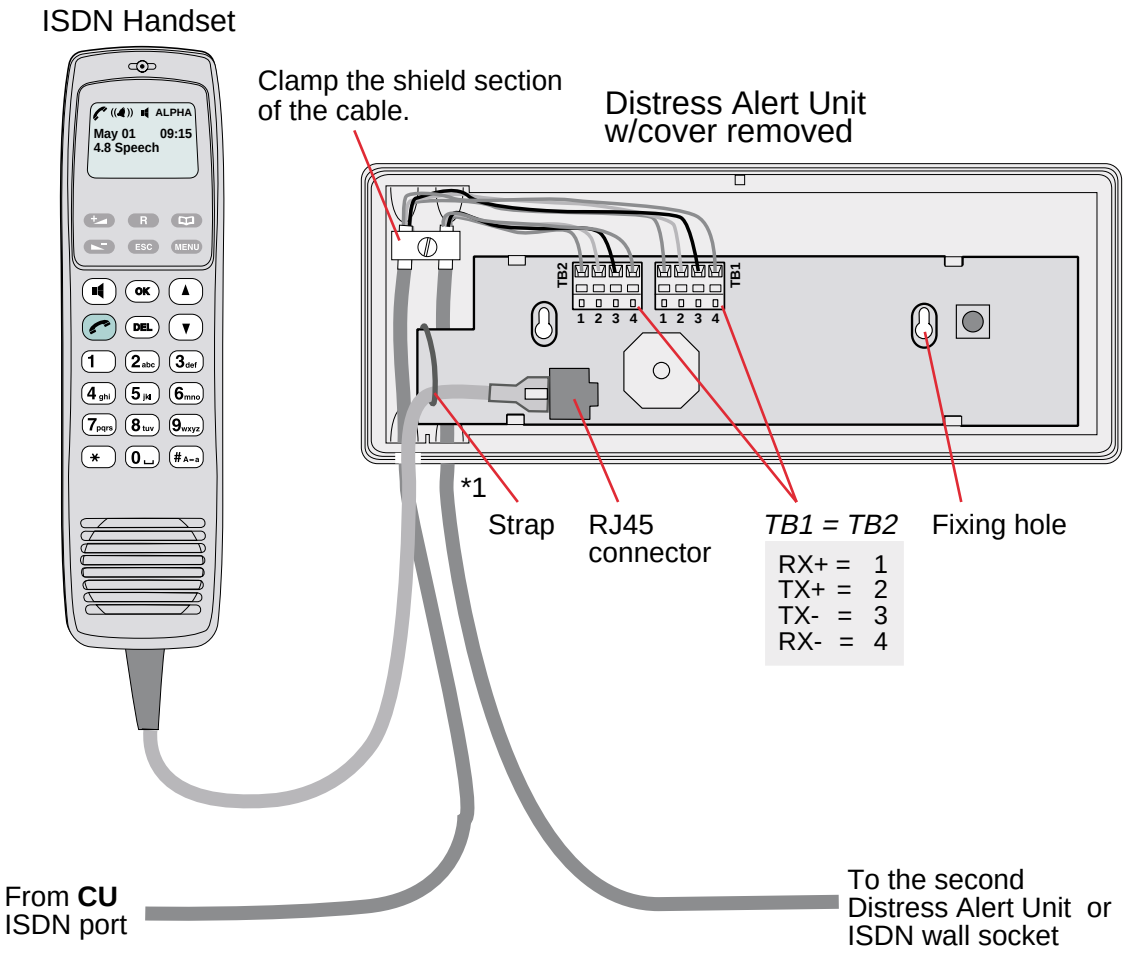
Insert the shell into the pin.
Screw the clamp nut into the shell.
(Tighten by turning the clamp nut.
Do not tighten by turning the shell.)

*How to attach the antenna cable connector N-P-12DSF*

## Distress Alert Unit

The Distress Alert Unit is connected to the ISDN bus/connector on the CU.
The maximum number of Distress Alert Unit is limited to *two*.
When connected to the Distress Alert Unit, in addition to regular ISDN voice service the ISDN Handset will also include the capability for Distress handling (Transmit & Receive).

1. Remove the cover of the Distress Alert Unit.
2. Mount the unit with two topping screws to a suitable places.
3. Connect cables as shown below.

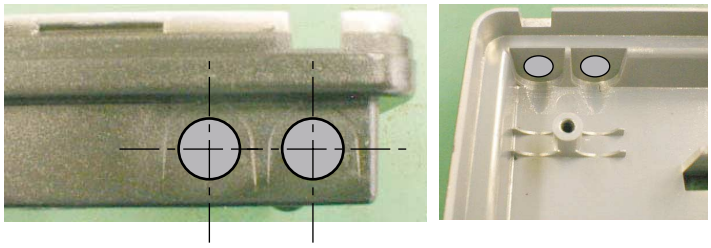



*1 To connect second Distress Alert Unit or ISDN wall socket, make a hole ϕ8 by using drill.

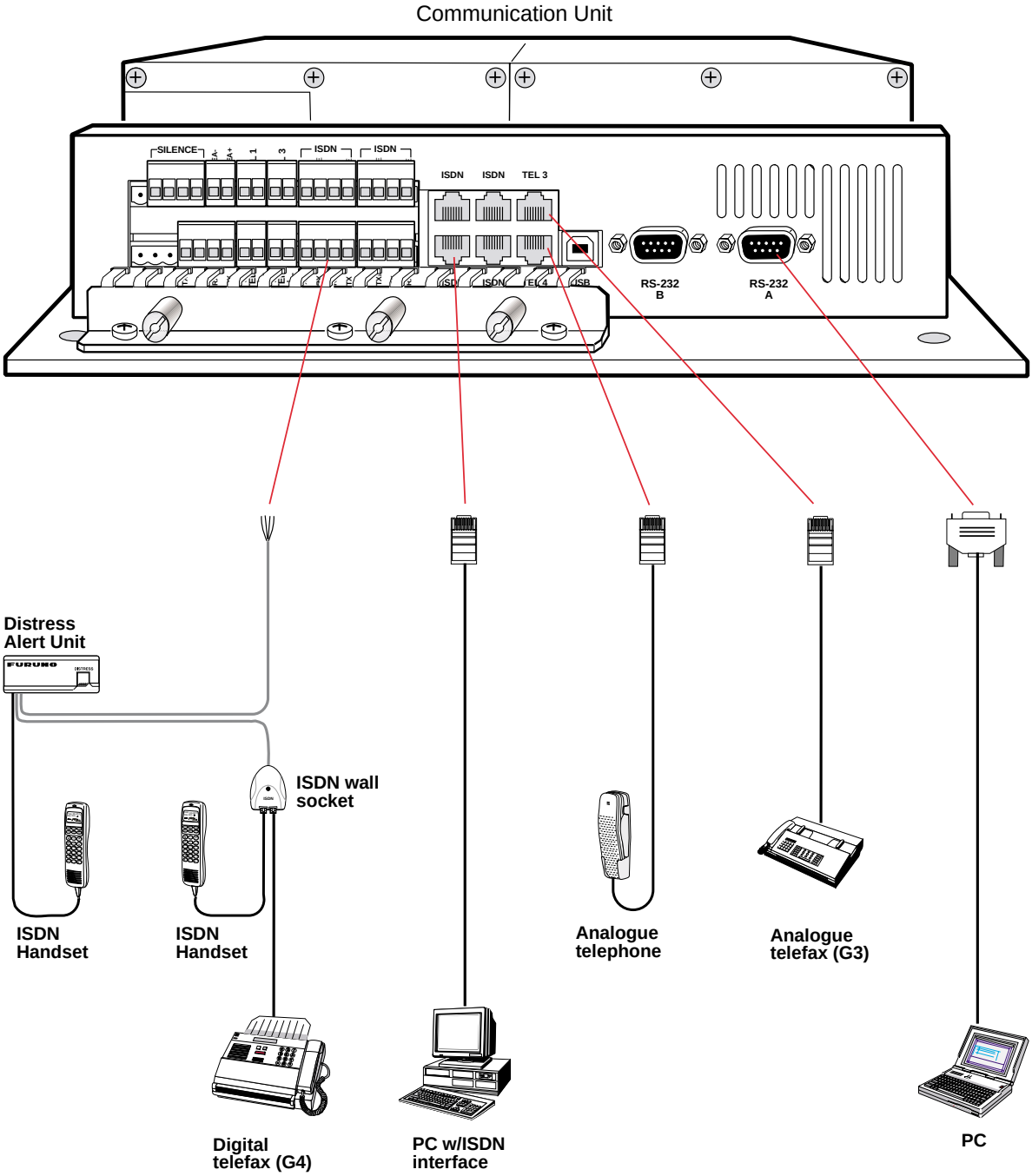
Procedure

1. Open the lid of the Distress Alert Unit.
2. Remove the printed circuit board.

3. Make a hole of ϕ 8 mm at “a”, “b” or “c” position shown in the figure above.
4. Remove burrs at the inside and outside of the case.



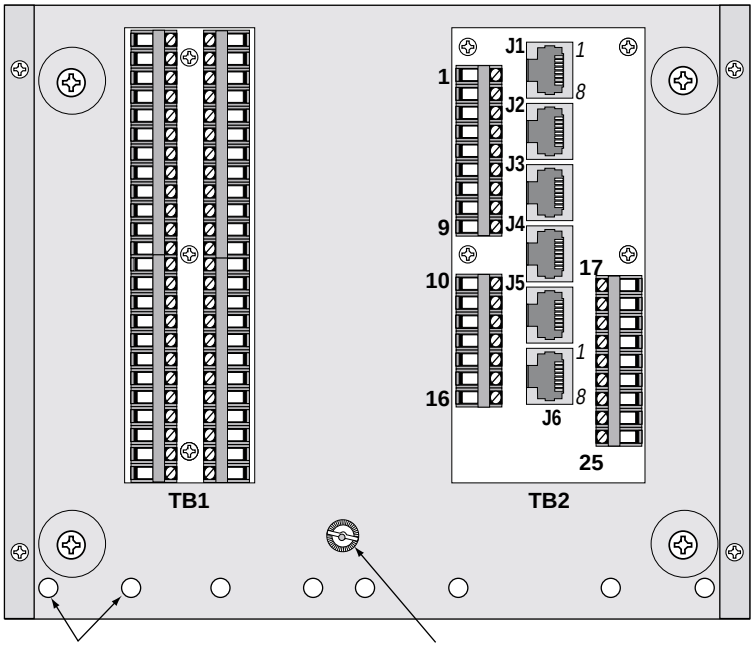
# Examples of Below Deck Equipment



# 2.4 Installing option units

## Connection Box QUFC 911 918 (option)

### Inside Connection Box



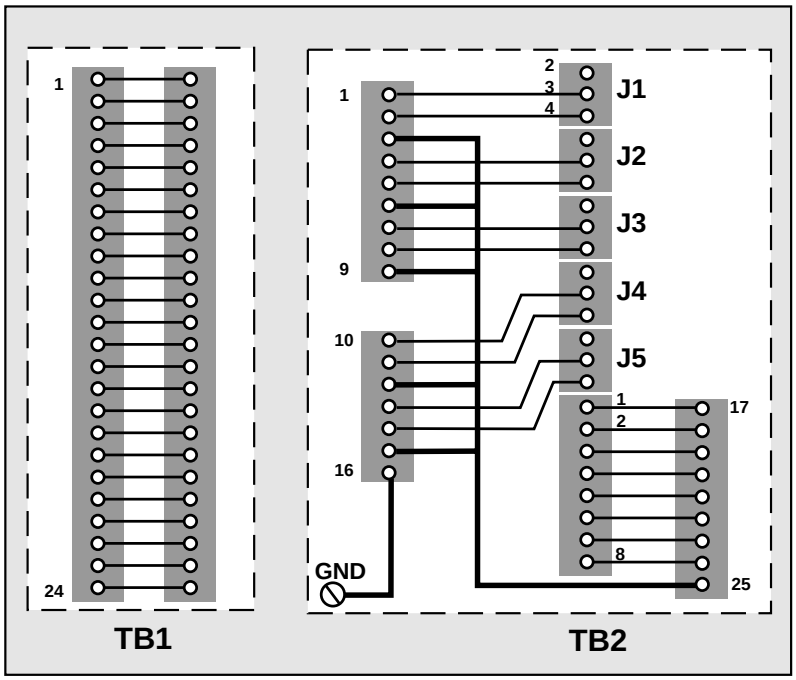

*J1 - J6: RJ45 w/grounded metal housing*

Holes for fastening cables with cable-tie.

Ground this Terminal to ship's body with 2.5sq wire.

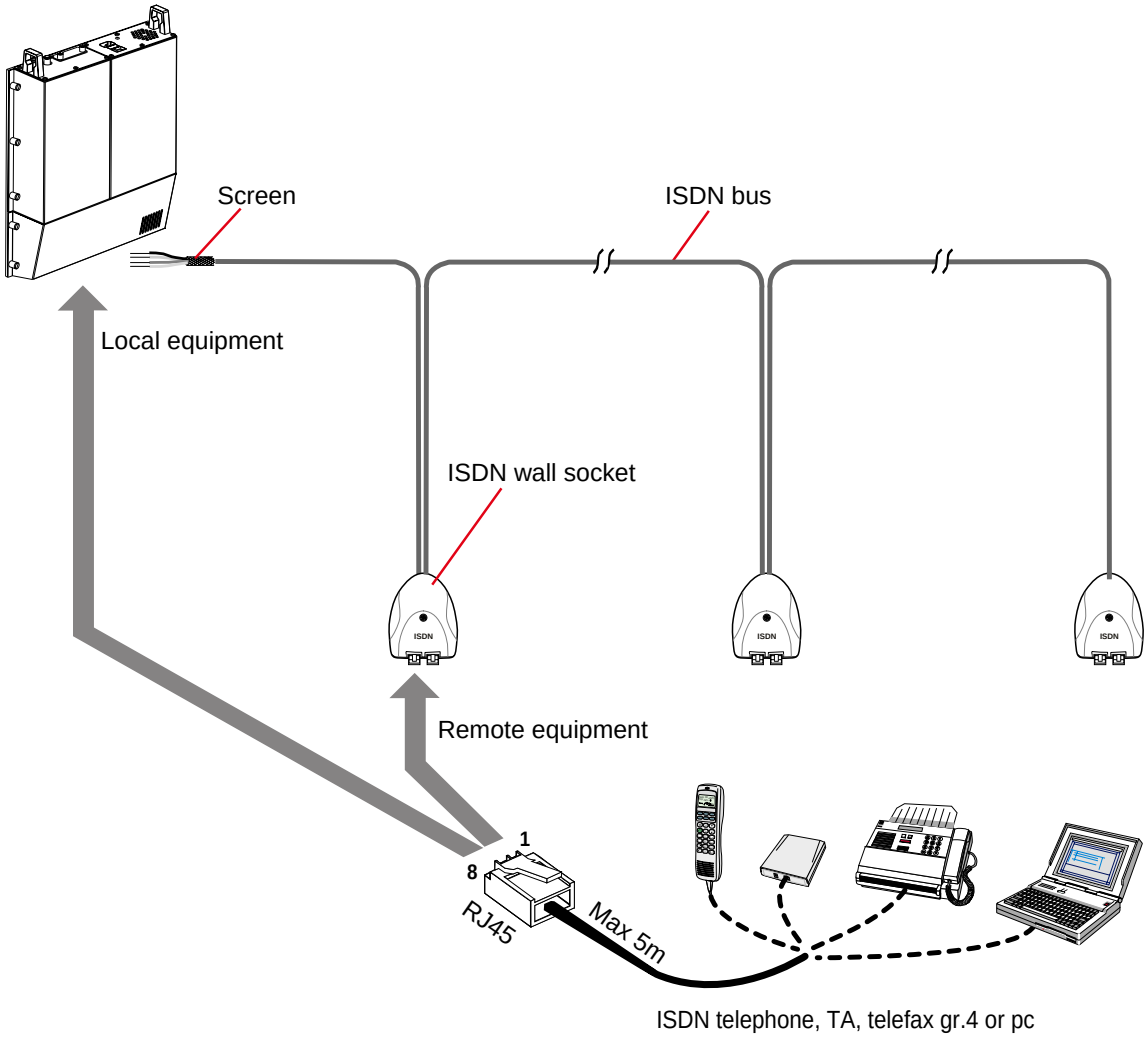
**Note:** Before installing the connection box, connect cables and fasten the cables with cable ties.

### Wiring

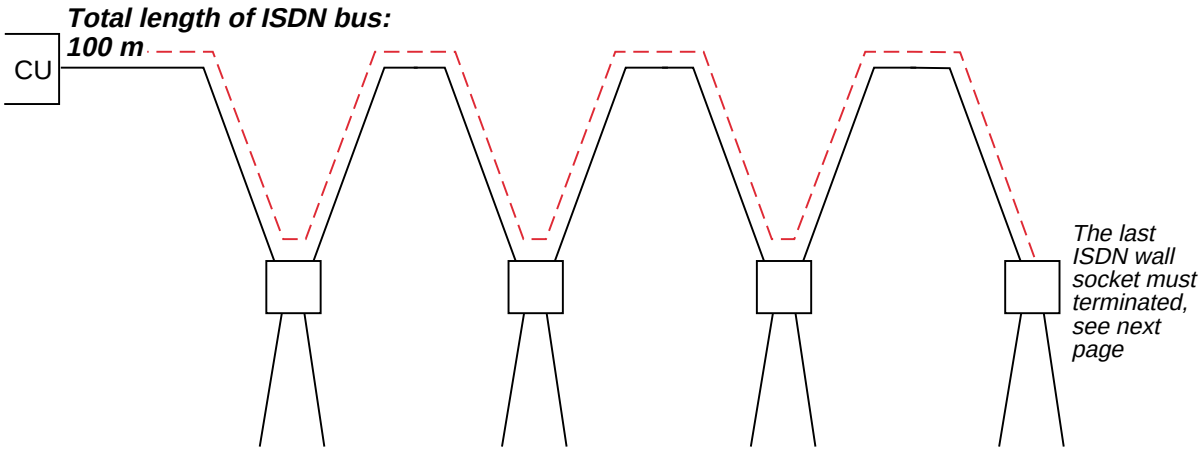


## ISDN telephones/equipment

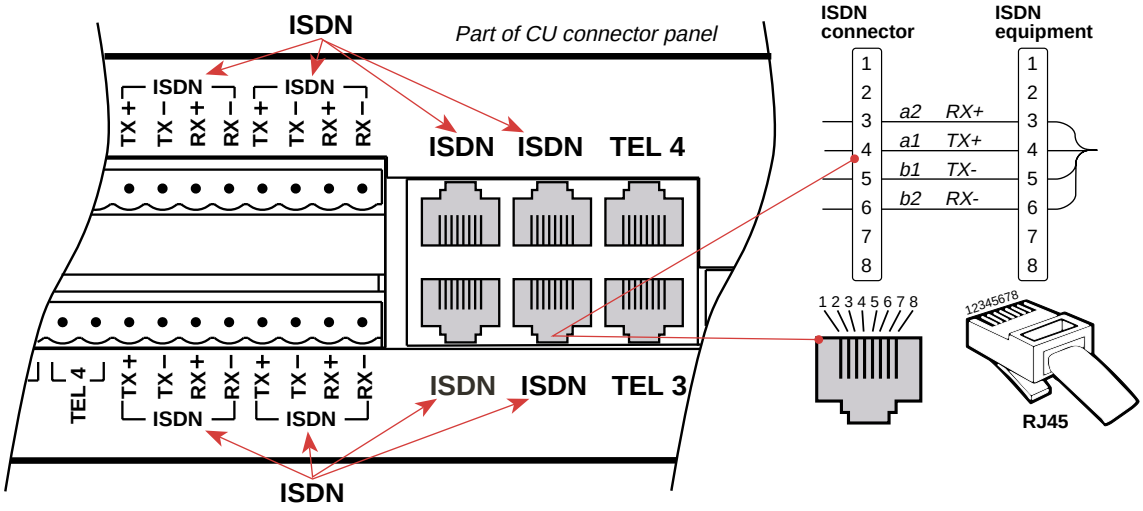
ISDN equipment is connected to the **ISDN** outlets on the CU connector panel, either to terminal blocks or RJ45 jacks.
An ISDN bus can be connected to *one* of the ISDN outlets.
Max. extension length: 100 m, min. 0.22 mm$^2$.



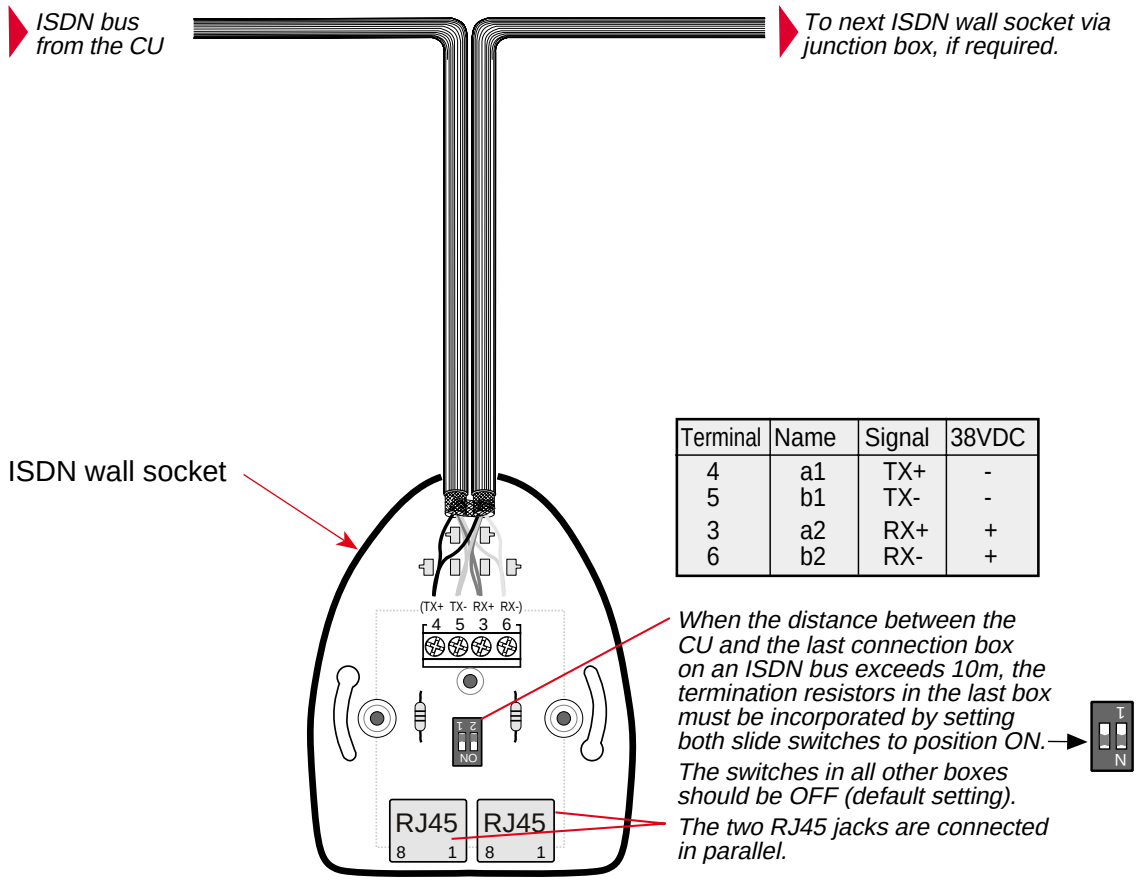

## ISDN cable lengths




***Up to 8 ISDN devices can be operated with FELCOM 70***



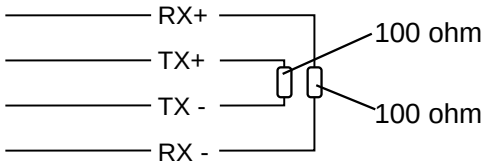

## ISDN wall socket


ISDN bus from the CU
To next ISDN wall socket via junction box, if required.
ISDN wall socket
(TX+ TX- RX+ RX-)
4 5 3 6
RJ45
RJ45
8 1
8 1
When the distance between the CU and the last connection box on an ISDN bus exceeds 10m, the termination resistors in the last box must be incorporated by setting both slide switches to position ON.
The switches in all other boxes should be OFF (default setting).
The two RJ45 jacks are connected in parallel.

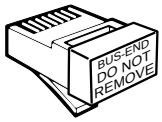
| Terminal | Name | Signal | 38VDC |
|---|---|---|---|
| 4 | a1 | TX+ | - |
| 5 | b1 | TX- | - |
| 3 | a2 | RX+ | + |
| 6 | b2 | RX- | + |

## ISDN bus termination

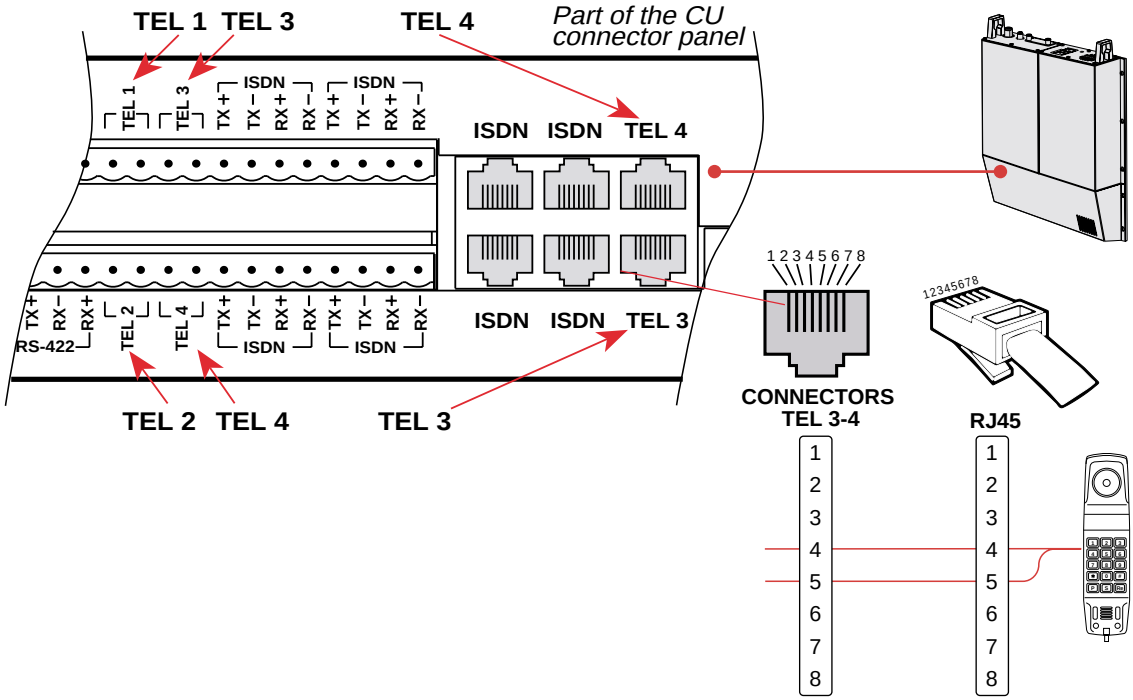
When longer than 10 metres, the end of the ISDN bus must be terminated by two resistors as shown below. Only one bus/termination per CU.
*Be aware that only one ISDN cable is permitted to be longer than 10 metres.*




*Alternative termination:*
*ISDN bus end plug*




## Analogue telephones



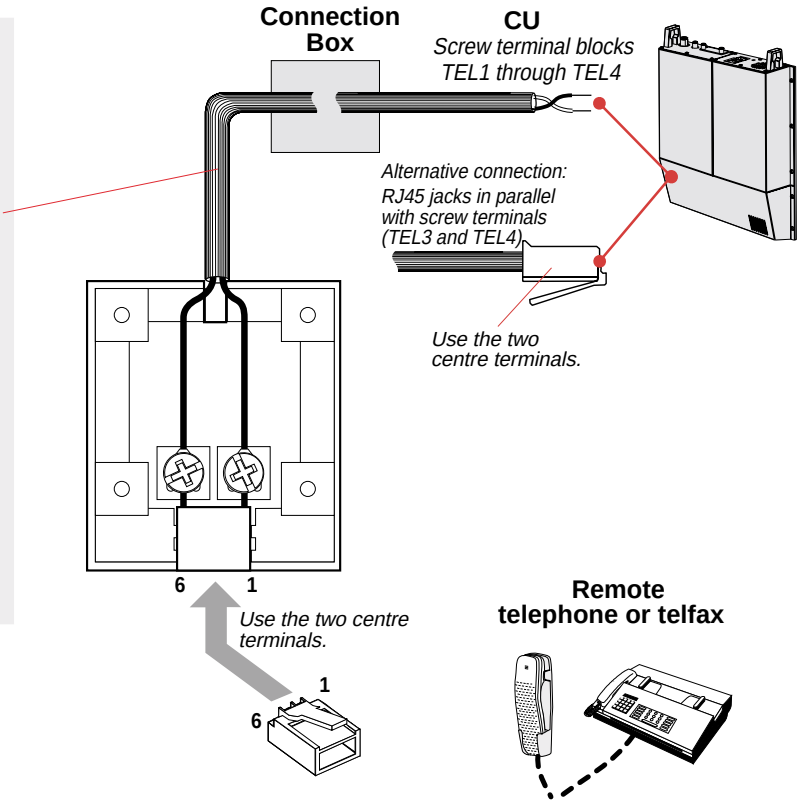

Analogue telephones and G3 fax are connected to the **TEL1** through **TEL4** outlets.
For TEL3 and TEL4 RJ45 jacks are provided in parallel.
*See diagrams for RJ11 pin configuration.*
Max. extension length: 150 m, min. 0.22 $mm^2$ .

## Wall socket for analogue telephone/telefax gr.3 (option)

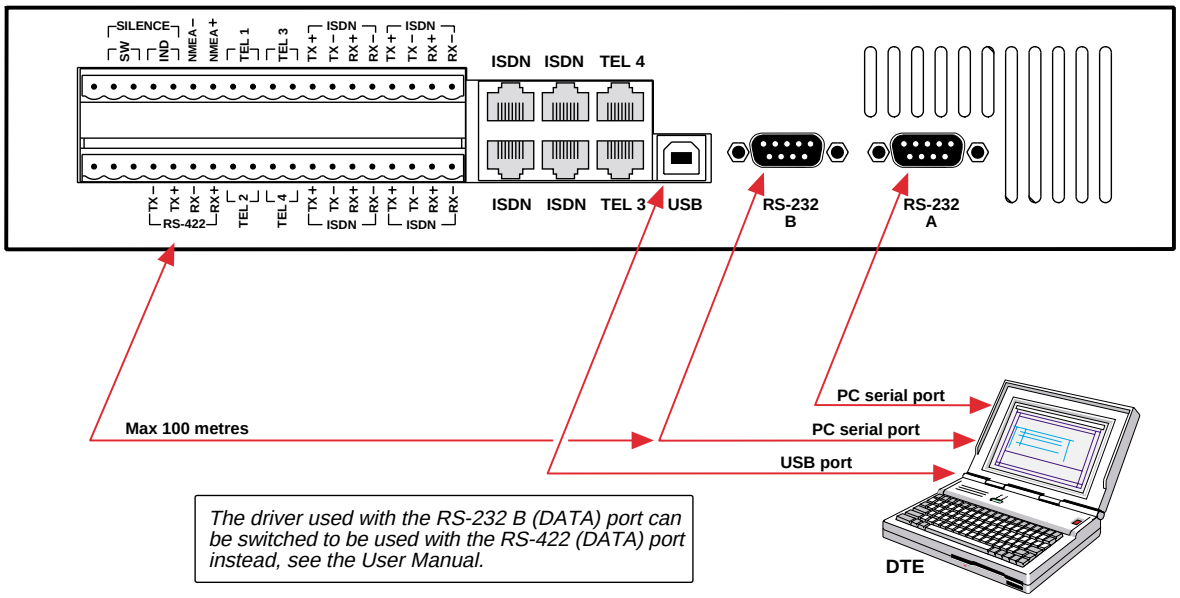
The telephone and/or telefax cable can be terminated in a modular jack, as shown.

Remove approx. 3 cm of the jacket from the cable end, strip off 1 cm of the insulation from each core and connect to centre terminals **3** and **4**.

Interchanging of the wires at terminals 3 and 4 has no effect.



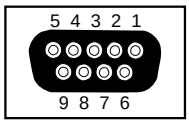

## PC - asynchronous data communication




*The driver used with the RS-232 B (DATA) port can be switched to be used with the RS-422 (DATA) port instead, see the User Manual.*

## RS-232 connector pin assignments

| *Pin number* | *Mne-monic* | *Circuit* | *DIN* | *CCITT circuit* | *Signal source* | *Dscription* |
|---|---|---|---|---|---|---|
| 1 | CD | | | 109 | DCE | Carrier detect |
| 2 | RXD | BB | D1 | 104 | DTE | Received Data |
| 3 | TXD | BA | D2 | 103 | DCE | Tramsmitted Data |
| 4 | DTR | | | 108 | DTE | Data terminal ready |
| 5 | GND | | | 102 | | Signal ground |
| 6 | DSR | | | 107 | DCE | Data set ready |
| 7 | RTS | CA | S2 | 105 | DTE | Request To Send |
| 8 | CTS | CB | M2 | 106 | DCE | Clear To Send |
| 9 | RI | | | 125 | DCE | Ring indicator |




*Signal source DTE means that the signal goes from the PC to FELCOM 70.*

*Signal source DCE means that the signal goes from FELCOM 70 to the PC.*

## Signal descriptions

**102 Signal Ground**
Digital ground, return line.

**103 Send Data**
Data transmitted from DTE (PC) to DCE (FELCOM 70).

**104 Receive data**
Data Received from DCE (FELCOM 70) to DTE (PC).

**105 Request To Send**
OFF requests DCE (FELCOM 70) to suspend transmission to DTE (PC).
ON requests DCE (FELCOM 70) to resume transmission to DTE (PC).

**106 Clear to send**
OFF indicates that DCE (FELCOM 70) cannot accept data from DTE (PC).
ON indicates that DCE (FELCOM 70) is prepared to accept data from DTE (PC).

**107 Data Set Ready**
Signal from FELCOM 70 that when ON indicates that a data call setup is in progress.

**108 Data Terminal Ready**
Signal from PC. This signal is used in the Hotline mode and indicate when going from OFF to ON that the PC wants to make a data call. The PC clears the call by setting the signal from ON to OFF.

**109 Receive Signal Indicator**
Signal from FELCOM 70 that when ON indicates that connection is established and received data will be delivered on circuit 104, Received Data.

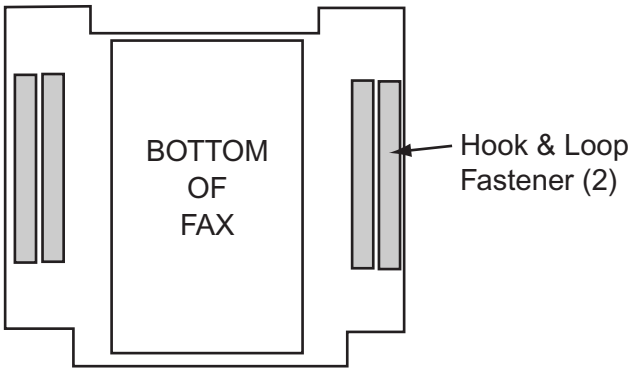
**125 Ring Indicator**
Signal from FELCOM 70. This signal is used in the Auto answer OFF mode and when ON indicates that an incoming call is in progress. The signal will go OFF when the call is answered by the PC by turning circuit 108 Data Terminal Ready ON.

## Mounting the Facsimile FAX-8070P (for CE type) /FAX-2850

Refer to the drawing below. Use only the installation materials supplied.

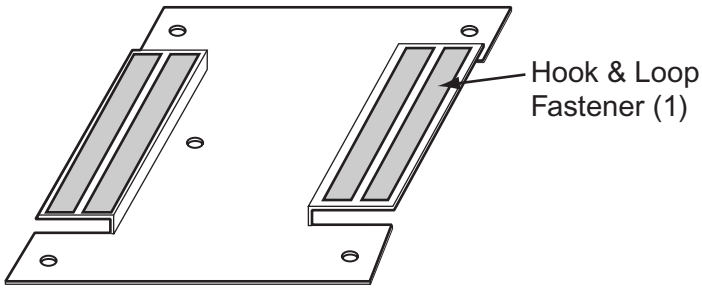
**Note:** When ship's main is 110/115 VAC, the optional transformer E-300 is required.

1. Attach four "rough" hook & loop fasteners (2) to the bottom of the facsimile as shown in the drawing below.



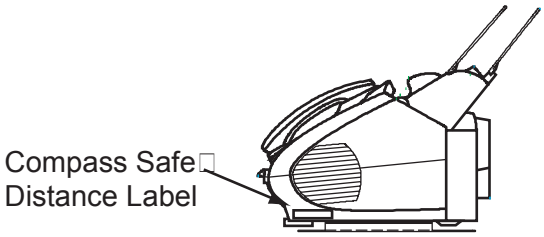

*Facsimile, bottom view*

2. Attach four "smooth" hook & loop fasteners (1) to the facsimile fixing plate as shown below.



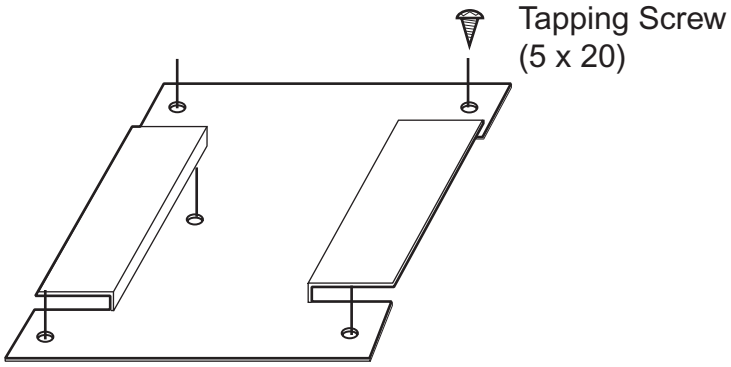

*Facsimile fixing plate*

3. Attach the compass safety distance label at the right side as shown below.

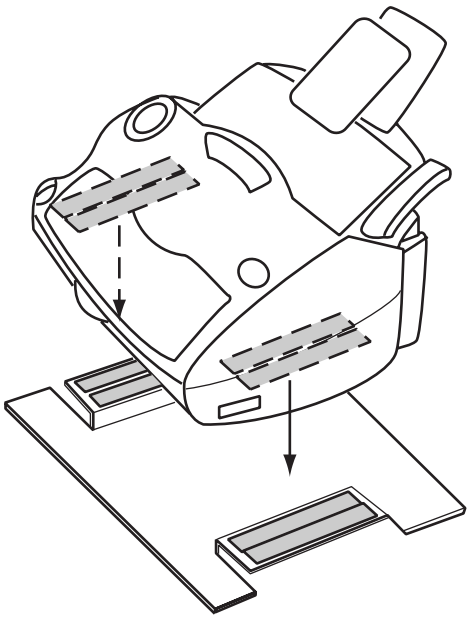



*Facsimile, side view*

4. Fasten the facsimile fixing plate to the mounting location with five tapping screws.




5. Set the facsimile on top of the facsimile fixing plate.



# Telephone FC755D1

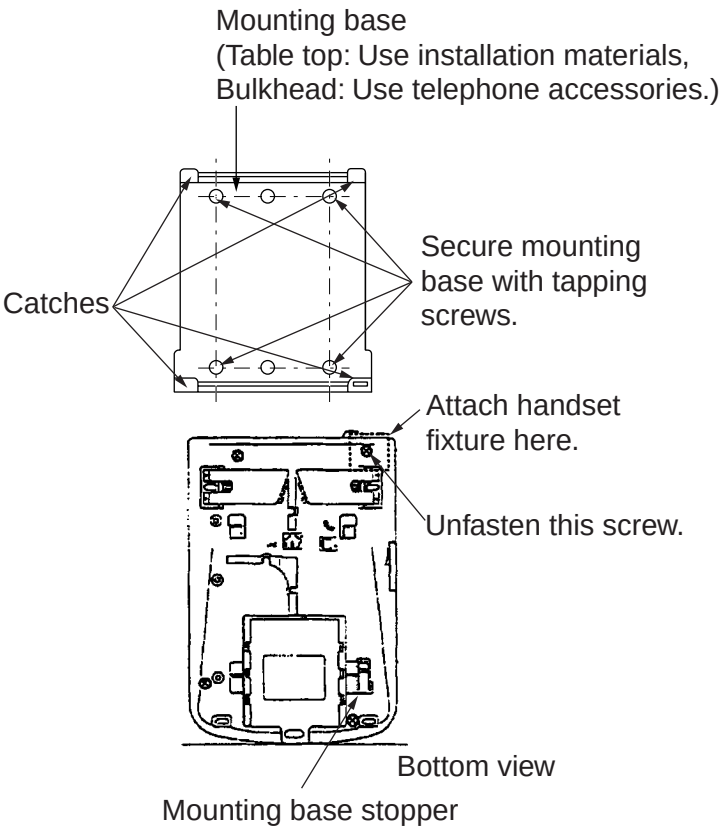
## General

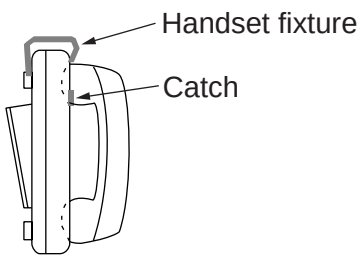
The telephone can be installed on a tabletop or a bulkhead. Select a location where the unit can easily be operated.

- For installation on a wooden table, use the mounting base and tapping screws (supplied).
- For installation on a steel table, fix the telephone with nuts and bolts.
- For bulkhead mounting, use the bulkhead mounting base (supplied with telephone accessories).

## Mounting location

Select a location where temperature and humidity are moderate and stable. Secure sufficient space around the unit for ease of operation and maintenance.



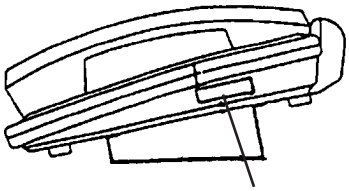

## Mounting

The mounting dimensions are given in the outline drawing at the back of this manual. Determine the mounting location, leaving sufficient space around the unit, and then fix the mounting base to the mounting location. The mounting base is different for bulkhead and tabletop mounting, however the mounting procedure is the same for all.

1. Fix the mounting base to the mounting location with four tapping screws (4x16).
2. On the underside of the telephone, unfasten the screw shown in the figure. (The screw may be discarded.) Attach vulcanizing tape (supplied) to the handset fixture. Fasten the handset fixture to the underside of the telephone with a screw (3x14, supplied).

3. The catch in the receiver cradle functions to hang up the handset completely. Set the catch in the upward position as shown in left. (To detach the handset from the hanger, slide the handset upward.)

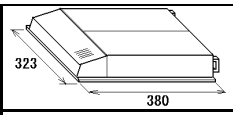
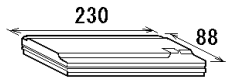
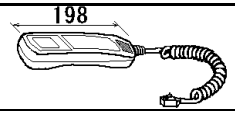
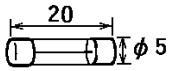
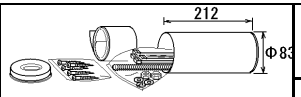
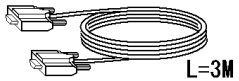
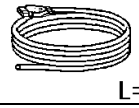
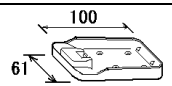
4. Set the telephone to the four catches in the mounting base and then slide it toward you until you hear a click
5. Attach the “SLIDE” label (supplied) to the handset.
6. Attach English language label (supplied) to the telephone.
7. Attach the label for compass safe distance (16-007-6927-0) and as shown below.



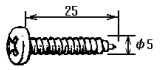
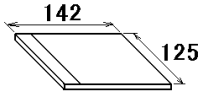
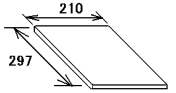
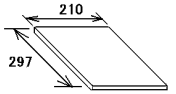
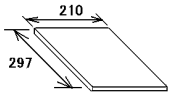
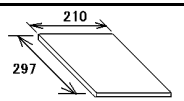
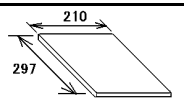

*Telephone, attaching the label*

# PACKING LIST SF-270/370/870-J/E



| NAME | OUTLINE | DESCRIPTION/CODE Nº | Q'TY |
|---|---|---|---|
| **ユニット UNIT** | | | |
| 通信制御ﾕﾆｯﾄ<br>COMMUNICATION UNIT |  | SF-270<br>000-043-220 | 1 |
| 遭難警報発呼器<br>DISTRESS ALART UNIT |  | SF-370<br>000-043-444 | 1 |
| ISDNﾊﾝﾄﾞｾｯﾄ<br>ISDN HANDSET |  | SF-870<br>000-043-349 | 1 |
| **通信制御用予備品 COMMUNICATION UNIT SPARE PARTS** | | | **SP16-01601** |
| ﾋｭｰｽﾞ<br>FUSE |  | NGH24104/5<br>000-148-338 | 2 |
| **通信制御用工材 COMMUNICATION UNIT INSTALLATION MATERIALS** | | | |
| BDE工事材料<br>BDE GROUNDING/MOUNTING |  | 101987<br>000-148-339 | 1 |
| ｹｰﾌﾞﾙ組品<br>CABLE ASSY. |  | R906686<br>000-148-340 | 1 |
| 電源ｹｰﾌﾞﾙ組品<br>POWER CABLE |  | P16-5-2<br>004-446-960 | 1 |
| **ISDNﾊﾝﾄﾞｾｯﾄ用付 ISDN HANDSET ACCESSORIES** | | | |
| ﾊﾝﾄﾞｾｯﾄﾎﾙﾀﾞｰ<br>HAND SET HOLDER |  | QSXA911394<br>000-147-689 | 1 |

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表型式/ｺｰﾄﾞを表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

| NAME | OUTLINE | DESCRIPTION/CODE Nº | Q'TY |
|---|---|---|---|
| **遭難警報器用工材 DISTRESS ALARM UNIT INSTALLATION MATERIALS** | | | |
| +ﾅﾍﾞﾀｯﾋﾟﾝﾈｼﾞ<br>+TAPPING SCREW |  | 5X25 SUS304 1ｼｭ<br>000-867-553 | 2 |
| 信号ｹｰﾌﾞﾙ組品<br>SIGNAL CABLE ASSY. | | S16-4-15<br>004-446-970 | 1 |
| **通信制御用付属品 COMMUNICATION UNIT ACCESSORIES** | | | |
| CD-ROM<br>CD-ROM |  | 1650178<br>004-447-930 | 1 |
| **図書 DOCUMENT** | | | |
| ｱﾌﾟﾘｹｰｼｮﾝﾌｫｰﾑ<br>REGISTRATION FOR SERVICE ACTIVATION |  | J5-95001-0*<br>000-807-330 | 1 |
| 取扱説明書<br>OPERATOR'S MANUAL |  | OMJ-56340-*<br>000-147-662 ** | 1 |
| 操作要領書<br>OPERATOR'S GUIDE |  | OSJ-56340-*<br>000-147-664 ** | 1 |
| 装備要領書<br>INSTALLATION MANUAL |  | IMJ-56340-*<br>000-147-666 ** | 1 |
| 遭難通信要領<br>DISTRESS COMMUNICATION |  | TIC-56340-*<br>000-147-668 | 1 |

A-1

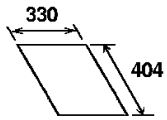
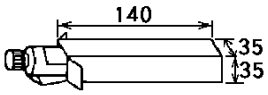
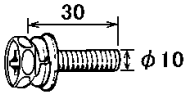
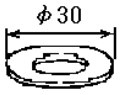
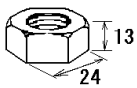
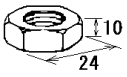
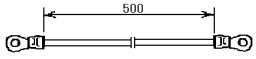
**（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）**

FURUNO

| CODE NO. | 004-446-480 | 16AM-X-9404 -4 |
|---|---|---|
| TYPE | CP16-02701 | 1/1 |

# 工事材料表
INSTALLATION MATERIALS

アンテナユニット
Antenna unit

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名／規格 DESCRIPTIONS | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|
| 1 | 放射危険ﾊﾘﾏｰｸ<br>CAUTION LABEL |  | 16-016-1802-0<br>CODE NO. 100-312-020 | 1 | ｱﾝﾃﾅへの接近警報<br>CAUTION FOR APPROACHING ANT. |
| 2 | ｽﾘｰﾎﾞﾝﾄﾞ<br>SEALANT |  | 1211 50G<br>CODE NO. 000-854-118 | 1 | ｱﾝﾃﾅﾕﾆｯﾄ固定用<br>ANTENNA UNIT FIXING |
| 3 | +ｱﾌﾟｾｯﾄUIｾﾑｽB<br>+HEX.BOLT (WASHER HEAD) |  | M10X30 SUS304<br>CODE NO. 000-147-145 | 4 | ｱﾝﾃﾅﾕﾆｯﾄ固定用<br>ANTENNA UNIT FIXING |
| 4 | ﾊﾞﾈ座金<br>SPRING WASHER | | M16 SUS304<br>CODE NO. 000-864-265 | 4 | ｱﾝﾃﾅﾕﾆｯﾄ固定用<br>ANTENNA UNIT FIXING |
| 5 | ﾐｶﾞｷ平座金<br>FLAT WASHER |  | M16 SUS304<br>CODE NO. 000-864-134 | 4 | ｱﾝﾃﾅﾕﾆｯﾄ固定用<br>ANTENNA UNIT FIXING |
| 6 | 六角ﾅｯﾄ１種<br>HEX. NUT |  | M16 SUS304<br>CODE NO. 000-863-114 | 4 | ｱﾝﾃﾅﾕﾆｯﾄ固定用<br>ANTENNA UNIT FIXING |
| 7 | 六角ﾅｯﾄ３種<br>HEX. NUT |  | M16 SUS304<br>CODE NO. 000-805-829 | 4 | ｱﾝﾃﾅﾕﾆｯﾄ固定用<br>ANTENNA UNIT FIXING |
| 8 | ｱｰｽ線<br>GROUNDING WIRE ASSY. |  | 16S0116-0<br>CODE NO. 000-132-825 | 1 | ｱﾝﾃﾅﾕﾆｯﾄ接地用<br>GROUND FOR ANTENNA UNIT |

16AM-X-9404

FURUNO ELECTRIC CO .,LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

| CODE NO. | | 16AM-X-9401 -0 |
|---|---|---|
| TYPE | | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

SF-170/171

| 番 号 NO. | 名 称 NAME | 略 図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | ｹｰﾌﾞﾙ組品<br>CABLE ASSY. | <br>L=100M | 12D-SFA-CV *100M* | | 1 | *選択<br>TO BE SELECT |
| | | | CODE NO. | 000-138-866 | | |
| 2 | ｱﾝﾃﾅｹｰﾌﾞﾙ組品<br>ANTENNA CABLE ASSY. | <br>L=30M | 8D-FB-CV *30M* | | 1 | *選択<br>TO BE SELECT |
| | | | CODE NO. | 000-111-547 | | |
| 3 | ｱﾝﾃﾅｹｰﾌﾞﾙ組品<br>CABLE ASSY. | <br>L=50M | 8D-FB-CV *50M* | | 1 | *選択<br>TO BE SELECT |
| | | | CODE NO. | 000-117-599 | | |

16AM-X-9401

FURUNO ELECTRIC CO .,LTD.

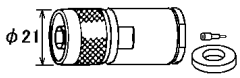
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

| CODE NO. | 004-446-490 | 16AM-X-9402 -0 |
|---|---|---|
| TYPE | CP16-02702 | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | ｺﾈｸﾀ(N)<br>CONNECTOR |  | N-P-8DFB<br>座金付き | | 1 | ｱﾝﾃﾅｹｰﾌﾞﾙ用<br>FOR ANTENNA CABLE. |
| | | | CODE NO. | 000-140-463 | | |

16AM-X-9402

FURUNO ELECTRIC CO .,LTD.

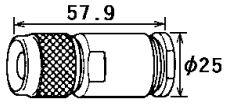
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

| CODE NO. | 004-446-500 | 16AM-X-9403 -0 |
|---|---|---|
| TYPE | CP16-02703 | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | ｺﾈｸﾀ(N)<br>CONNECTOR |  | N-P-12DSFA | | 1 | ｱﾝﾃﾅｹｰﾌﾞﾙ用<br>FOR ANTENNA CABLE. |
| | | | CODE NO. | 000-136-422 | | |

16AM-X-9403

FURUNO ELECTRIC CO ., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

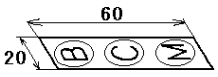
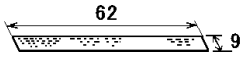
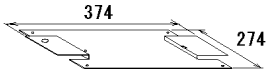
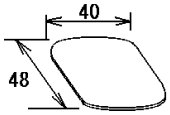
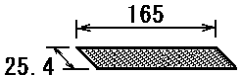
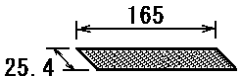
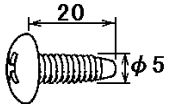
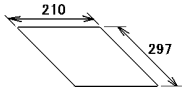
FURUNO

| CODE NO. | 004-430-050 | 16AI-X-9407 -2 |
|---|---|---|
| TYPE | CP16-02601 | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

For FAX-8070P/2850

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | ﾊﾘﾏｰｸ(INMAR)<br>LABEL (INMAR) |  | 16-007-6919-0 | | 1 | |
| | | | CODE NO. | 100-217-010 | | |
| 2 | ﾊﾘﾏｰｸ<br>LABEL |  | 16-007-6927-0 | | 1 | |
| | | | CODE NO. | 100-222-480 | | |
| 3 | 取付板<br>MOUNTING PLATE |  | 16-011-3101-1 | | 1 | |
| | | | CODE NO. | 100-303-181 | | |
| 4 | ﾌｯｸ押え板<br>HOOK RETENTION PLATE |  | 16-011-3102-0 | | 1 | |
| | | | CODE NO. | 100-303-190 | | |
| 5 | ﾏｼﾞｯｸﾃｰﾌﾟ(1)<br>ROOP FASTENER(1) |  | 16-011-3103-0 | | 4 | |
| | | | CODE NO. | 100-303-200 | | |
| 6 | ﾏｼﾞｯｸﾃｰﾌﾟ(2)<br>ROOP FASTENER(2) |  | 16-011-3104-0 | | 4 | |
| | | | CODE NO. | 100-303-210 | | |
| 7 | +ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ<br>+TAPPING SCREW |  | 5X20 SUS304 1ｼｭ | | 5 | |
| | | | CODE NO. | 000-802-081 | | |
| 8 | FAX取付手順書<br>FAX INSTALLATION PROCEDURES |  | C52-00204-A | | 1 | |
| | | | CODE NO. | 000-146-784 | | |

FURUNO ELECTRIC CO ., LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

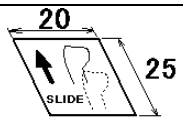
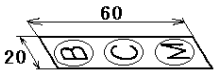
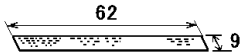
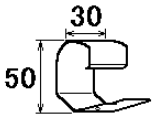
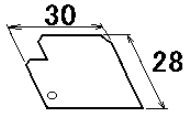
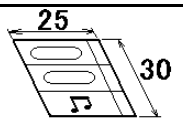
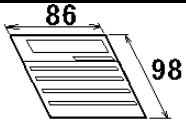
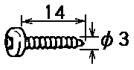
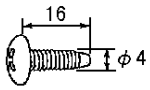
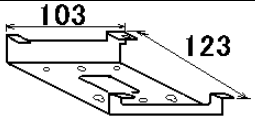
FURUNO

| CODE NO. | 004-438-410 | 16AG-X-9412 -0 |
|---|---|---|
| TYPE | CP16-00511 | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

For Telephone FC755D1

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | ﾊﾘﾏｰｸ(SLIDE)<br>LABEL(SLIDE) |  | 16-007-6405-0<br>CODE NO. | 100-222-470 | 1 | |
| 2 | ﾊﾘﾏｰｸ(INMAR)<br>LABEL (INMAR) |  | 16-007-6919-0<br>CODE NO. | 100-217-010 | 1 | |
| 3 | ﾊﾘﾏｰｸ<br>LABEL |  | 16-007-6927-0<br>CODE NO. | 100-222-480 | 1 | |
| 4 | 受話器固定具<br>HANDSET FIXTURE |  | 16-011-7101-1<br>CODE NO. | 100-273-831 | 1 | |
| 5 | 接着ﾃｰﾌﾟ<br>VULCANIZING TAPE |  | 16-011-7103-0<br>CODE NO. | 100-273-940 | 1 | |
| 6 | ｷｰｼｰﾙ<br>LABEL |  | 16-011-7111-0<br>CODE NO. | 100-273-850 | 1 | |
| 7 | ｼｰﾄ(TEL.)<br>SHEAT(TEL.) |  | 16-011-7112-0<br>CODE NO. | 100-273-860 | 1 | |
| 8 | +ﾅﾍﾞPﾀｲﾄﾈｼﾞ<br>SCREW |  | 3X14 SWCH18A MFZN-2-C<br>CODE NO. | 000-800-172 | 1 | |
| 9 | +ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ<br>+TAPPING SCREW |  | 4X16 SUS304 1ｼｭ<br>CODE NO. | 000-802-080 | 4 | |
| 10 | 壁掛金具<br>MOUNTING BASE |  | FC755WM<br>CODE NO. | 000-808-704 | 1 | |

16AG-X-9412

FURUNO ELECTRIC CO .,LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

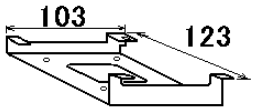
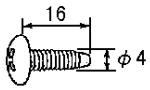
FURUNO

| CODE NO. | 004-438-420 | 16AG-X-9413 -0 |
|---|---|---|
| TYPE | CP16-00512 | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

For Telephone FC755D1

| 番 号 NO. | 名 称 NAME | 略 図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | 取付板<br>MOUNTING BASE |  | 16-011-7102-0 | | 1 | |
| | | | CODE NO. | 100-273-840 | | |
| 2 | +ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ<br>+TAPPING SCREW |  | 4X16 SUS304 1ｼｭ | | 4 | |
| | | | CODE NO. | 000-802-080 | | |

16AG-X-9413

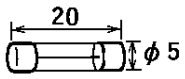
FURUNO ELECTRIC CO .,LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

| CODE NO. | 004-446-470 | 16AM-X-9301 -0 1/1 |
|---|---|---|
| TYPE | SP16-01501 | BOX NO. P |

| SHIP NO. | SPARE PARTS LIST FOR | U S E | SETS PER VESSEL |
|---|---|---|---|
| | | | |

| ITEM NO. | NAME OF PART | OUTLINE | DWG. NO. OR TYPE NO. | QUANTITY | | | REMARKS/CODE NO. |
|---|---|---|---|---|---|---|---|
| | | | | WORKING | | SPARE | |
| | | | | PER SET | PER VES | | |
| 1 | ﾋｭｰｽﾞ<br>FUSE |  | FGMB 5A AC125V | | | 1 | ｱﾝﾃﾅﾕﾆｯﾄ<br>ANTENNA UNIT<br>000-112-785 |
| | | | | | | | |
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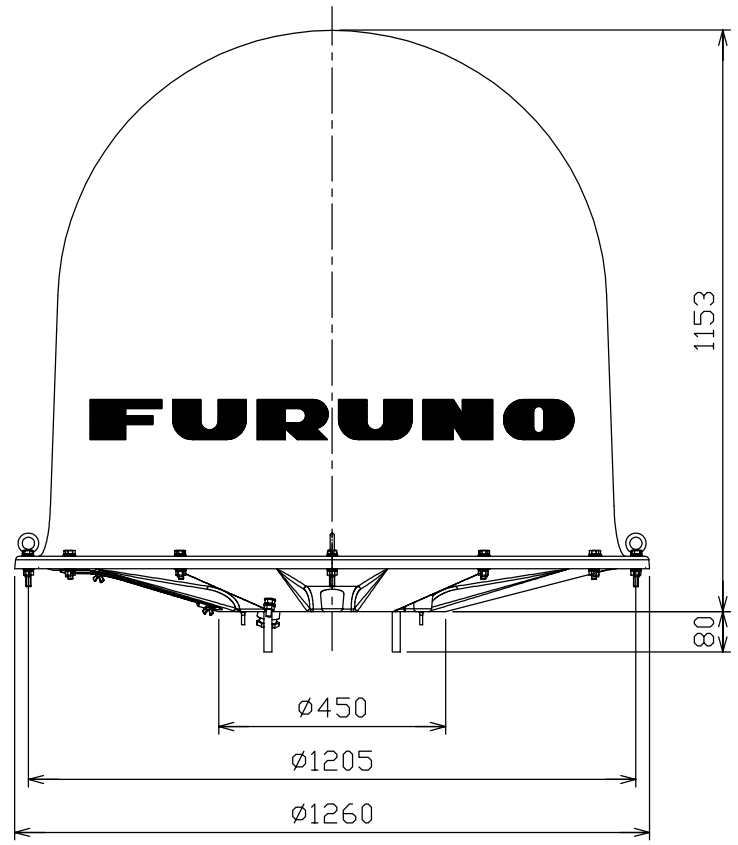
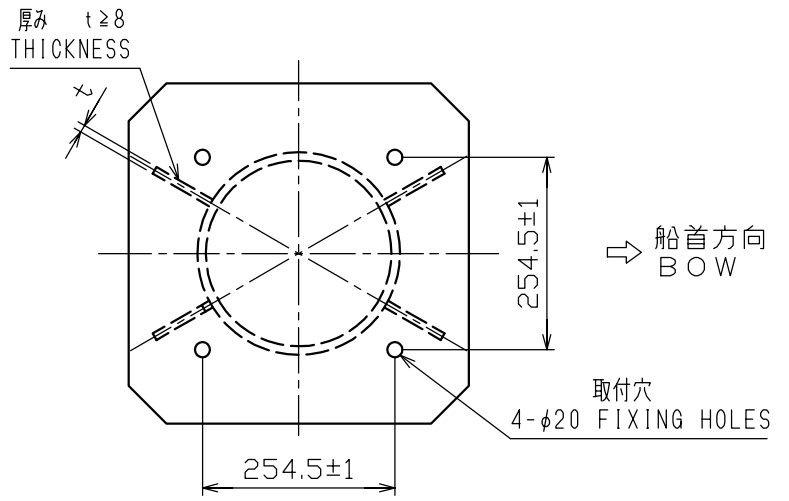
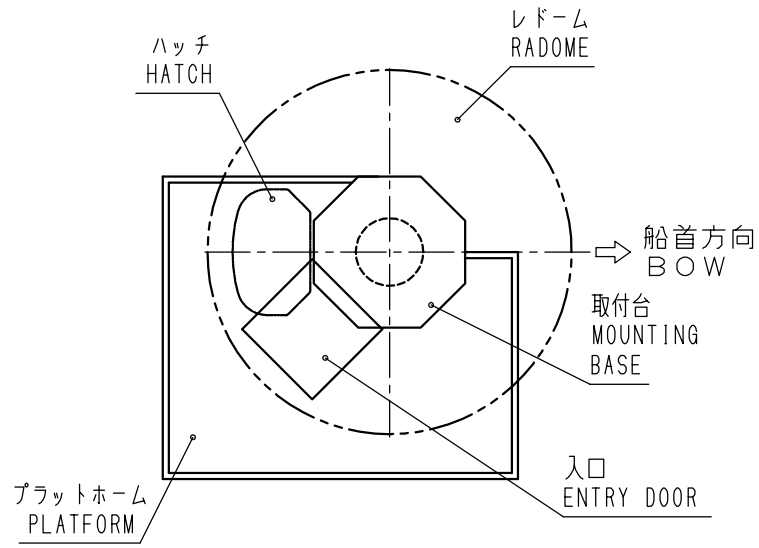
| MFR'S NAME | FURUNO ELECTRIC CO.,LTD. | DWG NO. | 16AM-X-9301 | 1/1 |
|---|---|---|---|---|

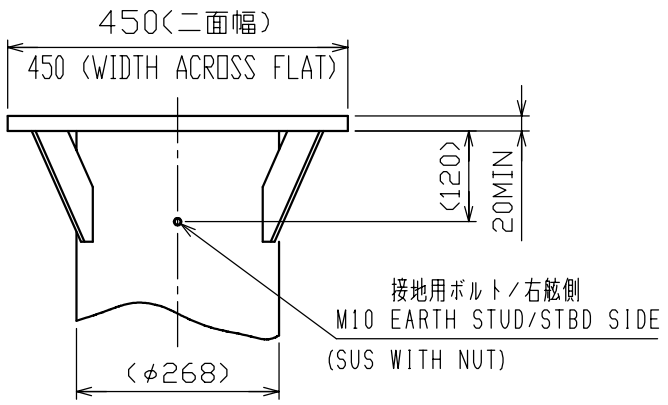
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO



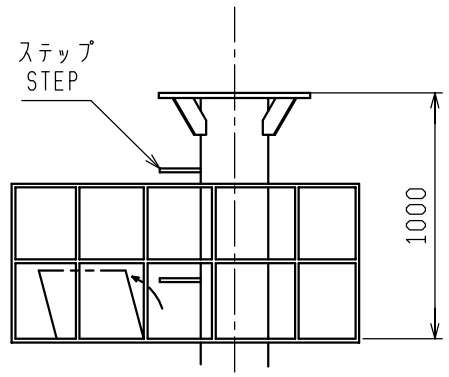



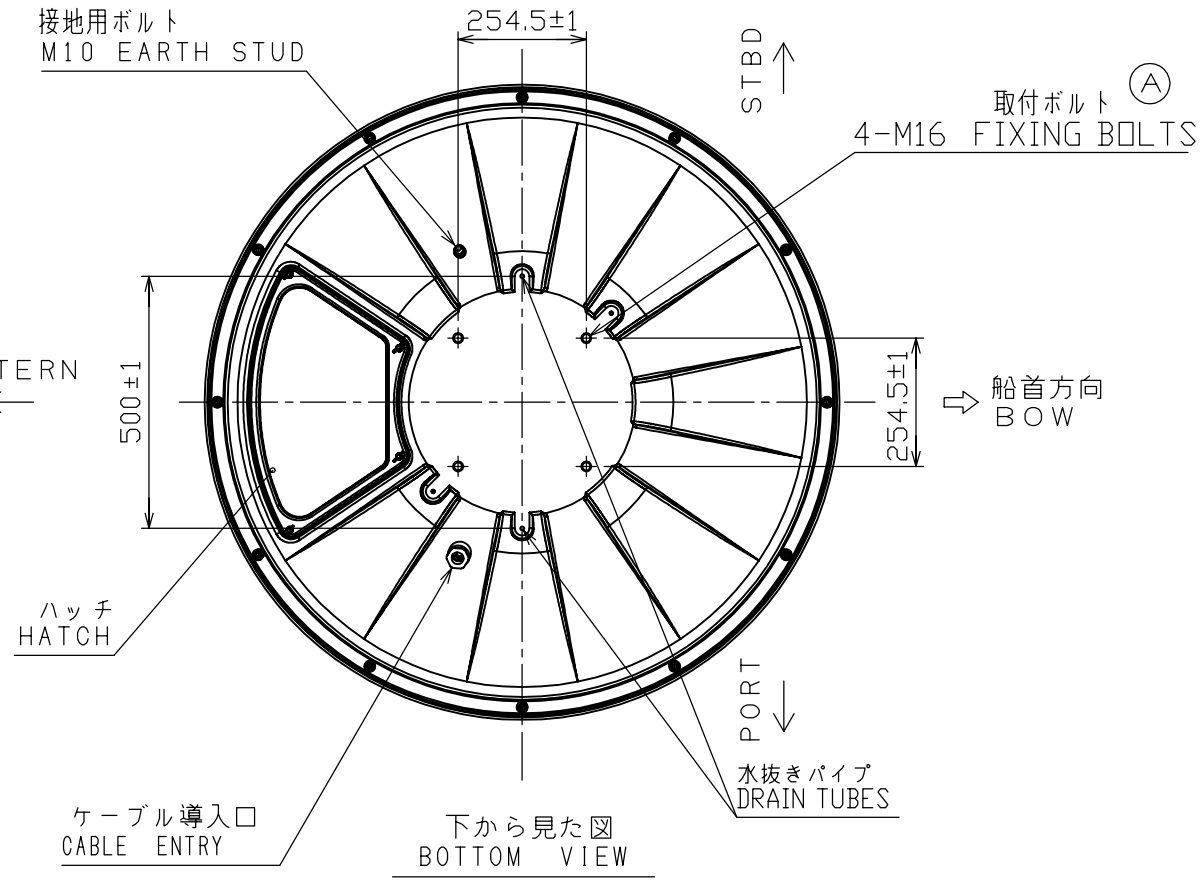




取付台
MOUNTING BASE

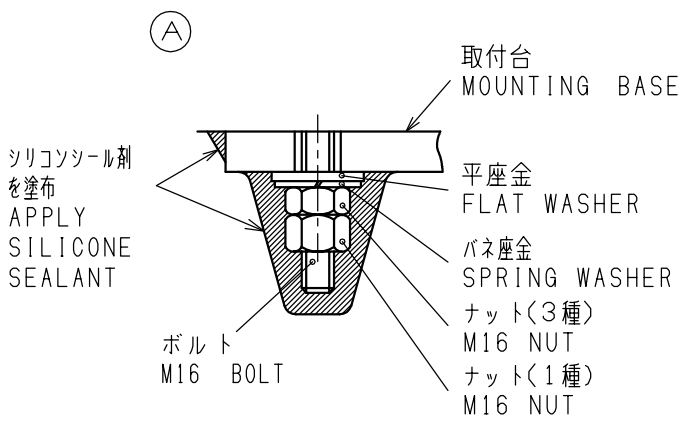
造船所手配
SHIPYARD SUPPLY



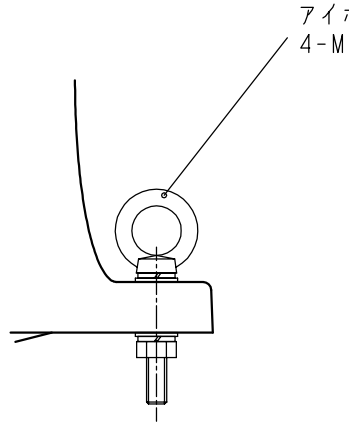

プラットホーム製作例
EXAMPLE OF PLATFORM




下から見た図
BOTTOM VIEW




取付ボルト部詳細図
DETAILS OF FIXING BOLT




吊り上げ用アイボルト
DETAILS OF EYEBOLT

| 寸法区分(mm) DIMENSION | 公差(mm) TOLERANCE |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |
| 500<L≦1000 | ±4 |
| 1000<L≦2000 | ±5 |

表1 TABLE 1

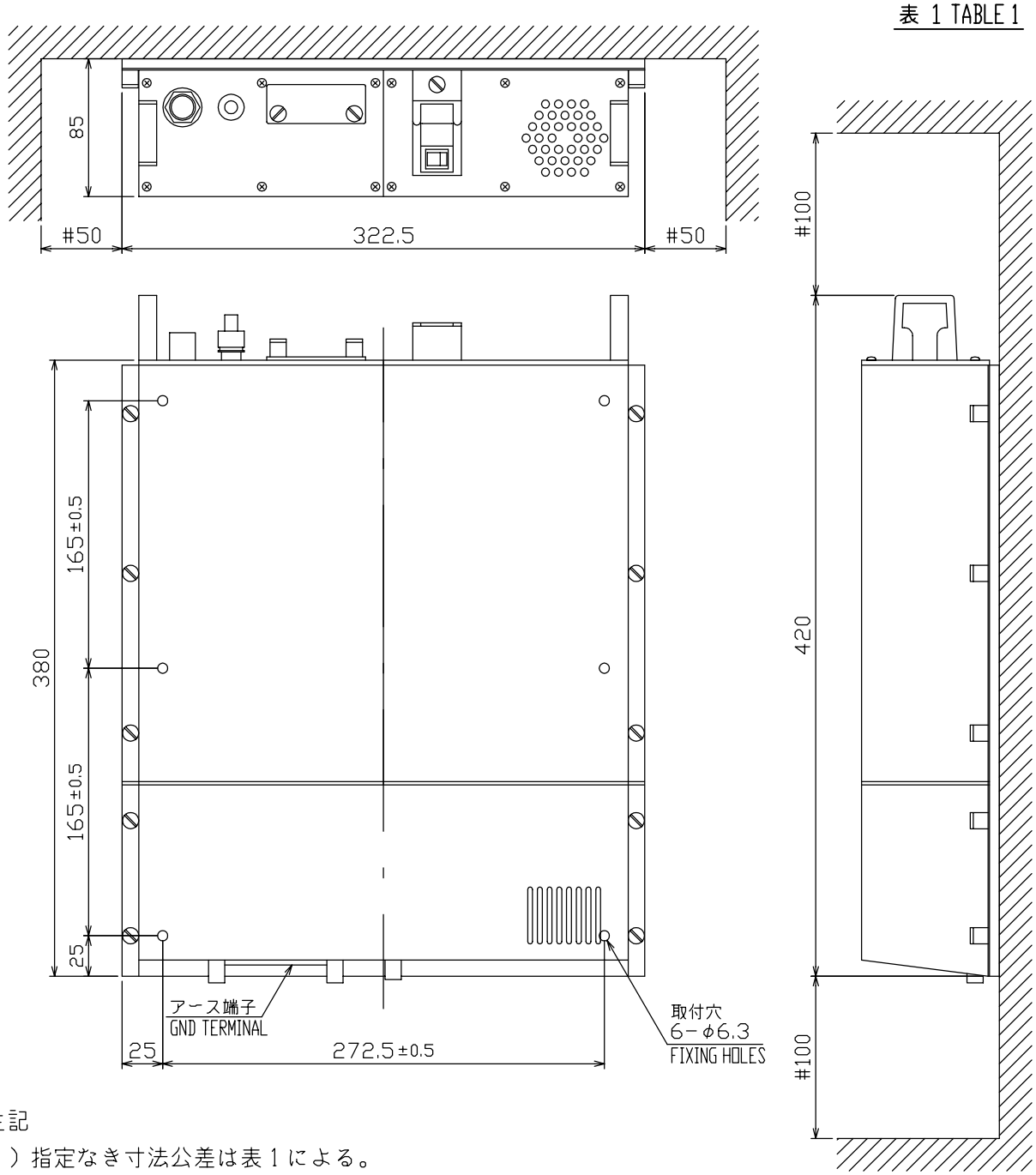
注 記 1) 指定外の寸法公差は表1による。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

| | | | |
|---|---|---|---|
| DRAWN Nov. 19 '03 T.YAMASAKI | | | TITLE SF-170 |
| CHECKED Nov. 19 '03 T.Matsuguchi | | | 名称 アンテナユニット |
| APPROVED Nov.20'03 T.Matsuguchi | FELCOM 70 | | 外寸図 |
| SCALE 1/15 | MASS 65 ±10% kg | | NAME ANTENNA UNIT |
| DWG.No. C5634-G04- D | 16-016-100G-2 | | OUTLINE DRAWING |

| 寸法区分（mm） DIMENSIONS | 公差（mm） TOLERANCE |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |

表 1 TABLE 1




注記

1）指定なき寸法公差は表 1 による。

2）＃：推奨する最小サービス空間寸法。

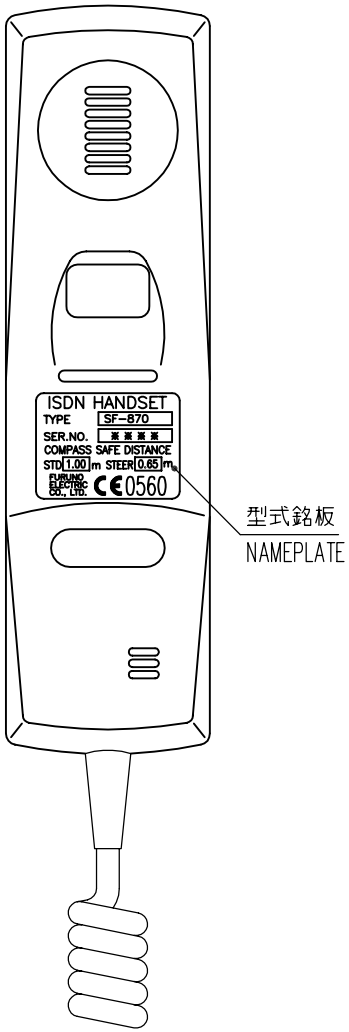
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

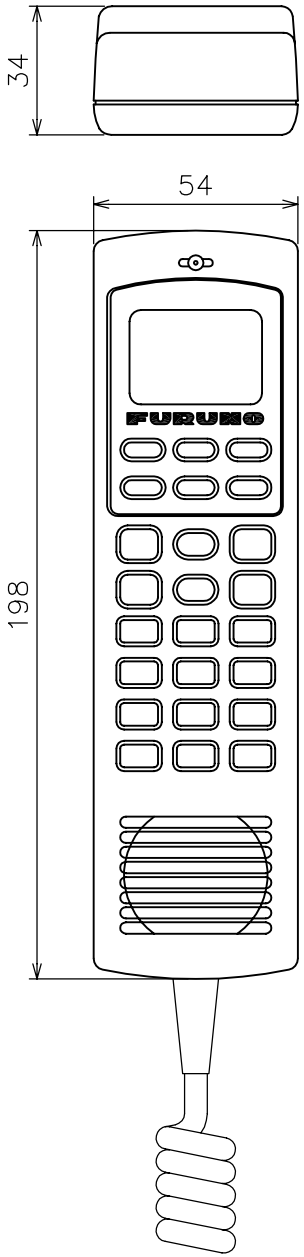
2. #: RECOMMENDED SERVICE CLEARANCE.

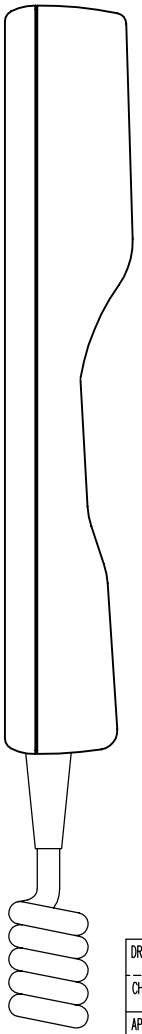
| | | | |
|---|---|---|---|
| DRAWN Nov. 7 '03 T.YAMASAKI | | | TITLE SF-270 |
| CHECKED Nov. 7 '03 T.MATSUGUCHI | | | 名称 通信制御ユニット |
| APPROVED Nov.10'03 T.Matsuguchi | FELCOM 70 | | 外寸図 |
| SCALE 1/4 | MASS 7.4 ±10% kg | | NAME COMMUNICATION UNIT |
| DWG No. C5634-G01- A | 16-016-200G-0 | | OUTLINE DRAWING |

FURUNO



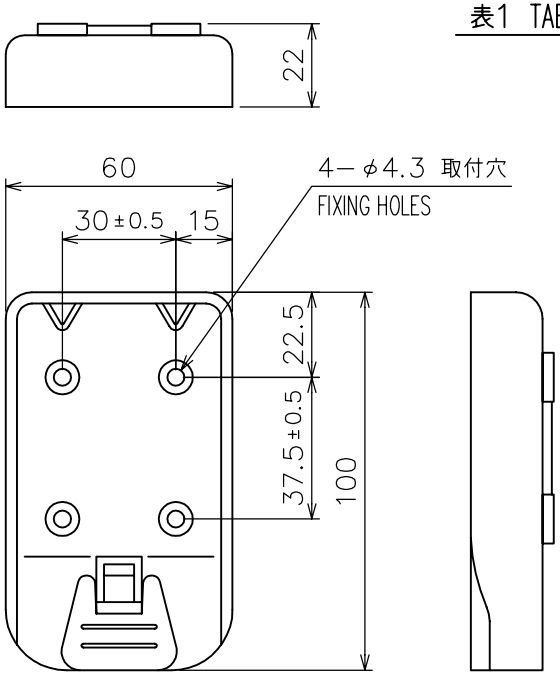

型式銘板
NAMEPLATE



| 寸法区分（mm） DIMENSIONS | 公差（mm） TOLERANCE |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |

表1 TABLE 1




ハンドセットホルダー
HANDSET HOLDER

注記
1）指定なき寸法公差は表1による。
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

| | | | |
|---|---|---|---|
| DRAWN Nov. 7 '03 T.YAMASAKI | | TITLE | SF-870 |
| CHECKED Nov. 7 '03 T.MATSUGUCHI | | 名称 | ハンドセット |
| APPROVED Nov.10'03 T.Matsuguchi | FELCOM 70 | | 外寸図 |
| SCALE 1/2 MASS 0.36 ±10% kg | | NAME | HANDSET |
| DWG.No. C5634-G02- A | 16-016-800G-0 | | OUTLINE DRAWING |



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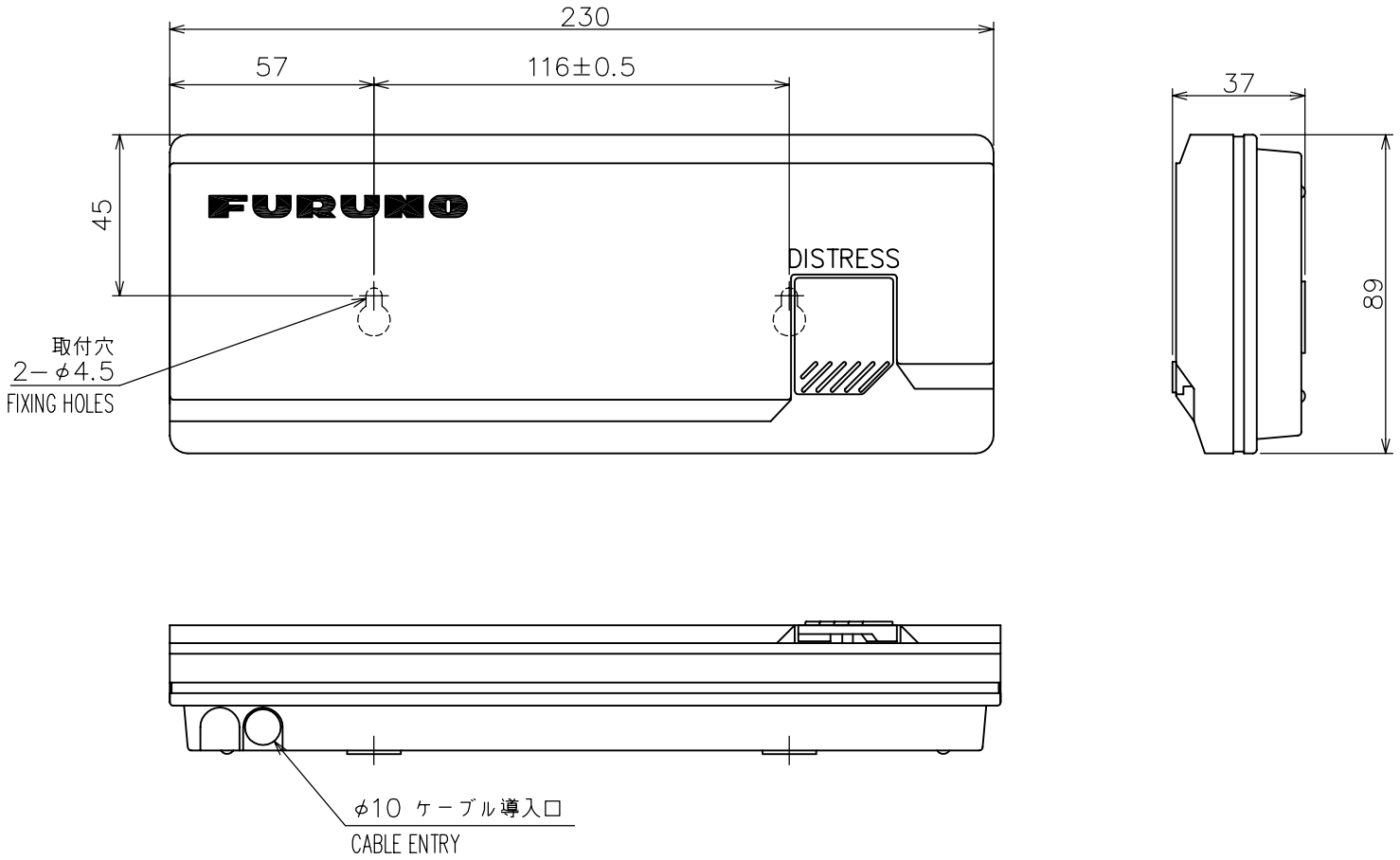
| 寸法区分（mm） DIMENSION | 公差（mm） TOLERANCE |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |

表 1 TABLE 1




注記
1）指定なき寸法公差は表 1 による。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

| | | | |
|---|---|---|---|
| DRAWN Nov. 18 '03 T. YAMASAKI | | | TITLE SF-370 |
| CHECKED Nov. 18 '03 T.Matsuguchi | | | 名称 遭難警報発呼器 |
| APPROVED Nov. 18'03 T. Matsuguchi | | FELCOM 70 | 外寸図 |
| SCALE 1/2 | MASS 0.24 ±10% kg | | NAME DISTRESS ALERT UNIT |
| DWG.No. C5634-G03- D | | 16-016-300G-0 | OUTLINE DRAWING |

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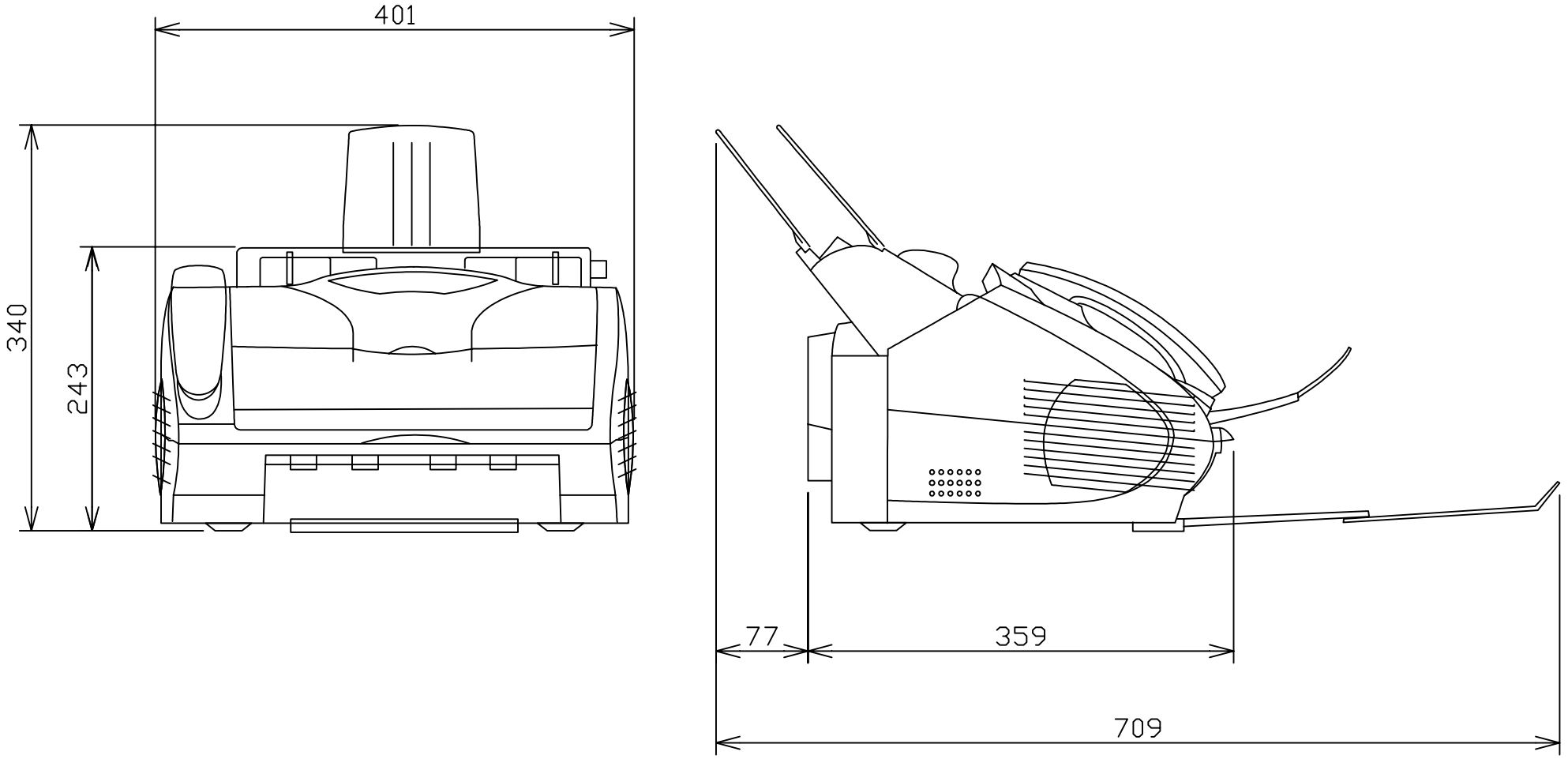


| | | | |
|---|---|---|---|
| DRAWN Oct. 18 '02 T. YAMASAKI | | | TITLE FAX-2850 / MFC-4800J |
| CHECKED Oct. 18 '02 Y.KIMURA | | | 名称 ファクシミリ |
| APPROVED Oct. 18.'02 Y. Kimura | | FELCOM 82 | 外寸図 |
| SCALE 1/5 | MASS 7.5 ±10% kg | | NAME FACSIMILE |
| DWG.No. C5624-G15- A | | | OUTLINE DRAWING |

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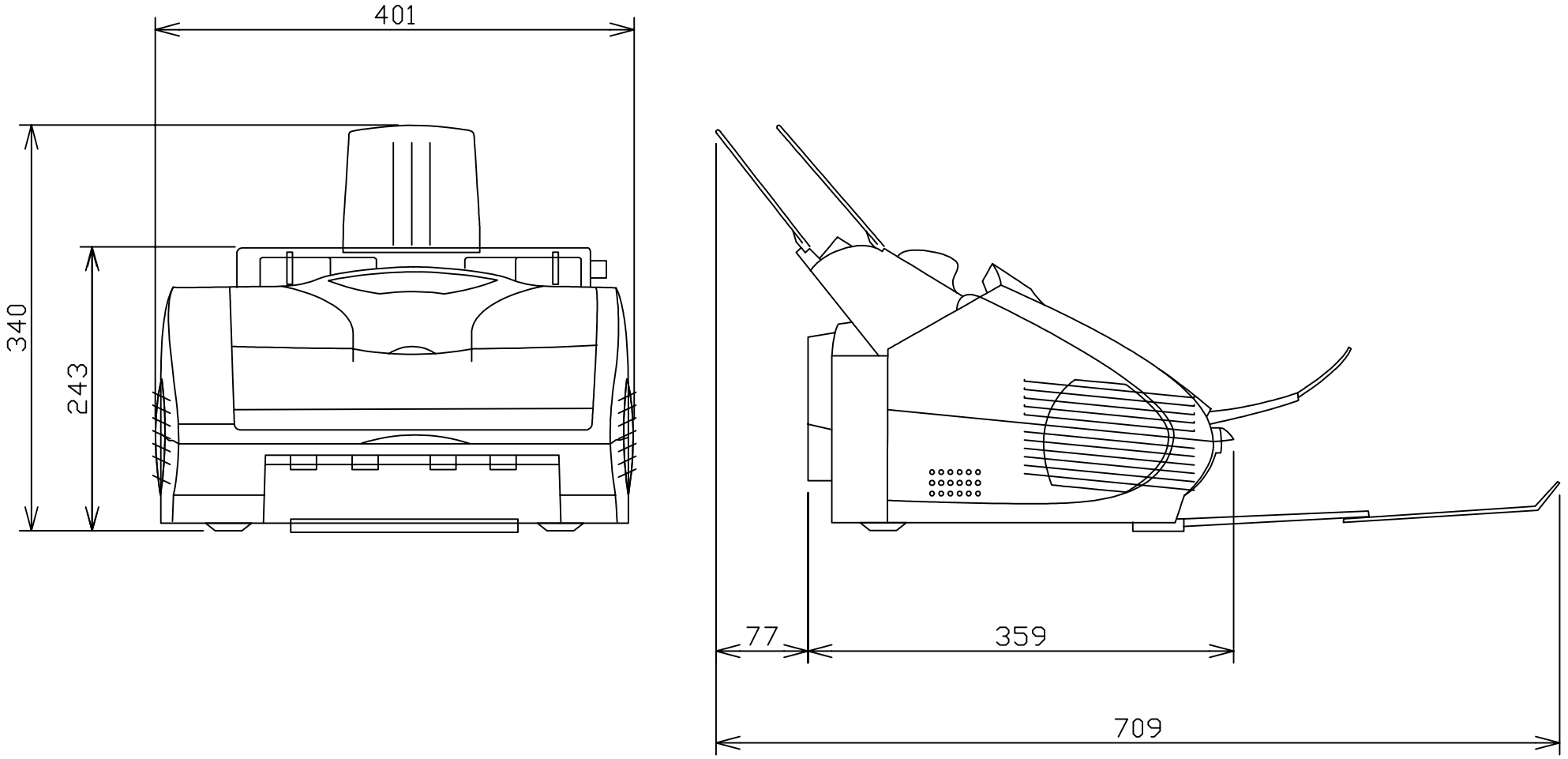


| | | | |
|---|---|---|---|
| DRAWN Dec. 9 '02 T. YAMASAKI | | | TITLE FAX-8070P |
| CHECKED Dec. 9 '02 Y.KIMURA | | | 名称 ファクシミリ |
| APPROVED Dec. 12, '02 Y. Kimura | FELCOM 82 | | 外寸図 |
| SCALE 1/5 | MASS 7.5 ±10% kg | | NAME FACSIMILE |
| DWG.No. C5624-G16- A | | | OUTLINE DRAWING |

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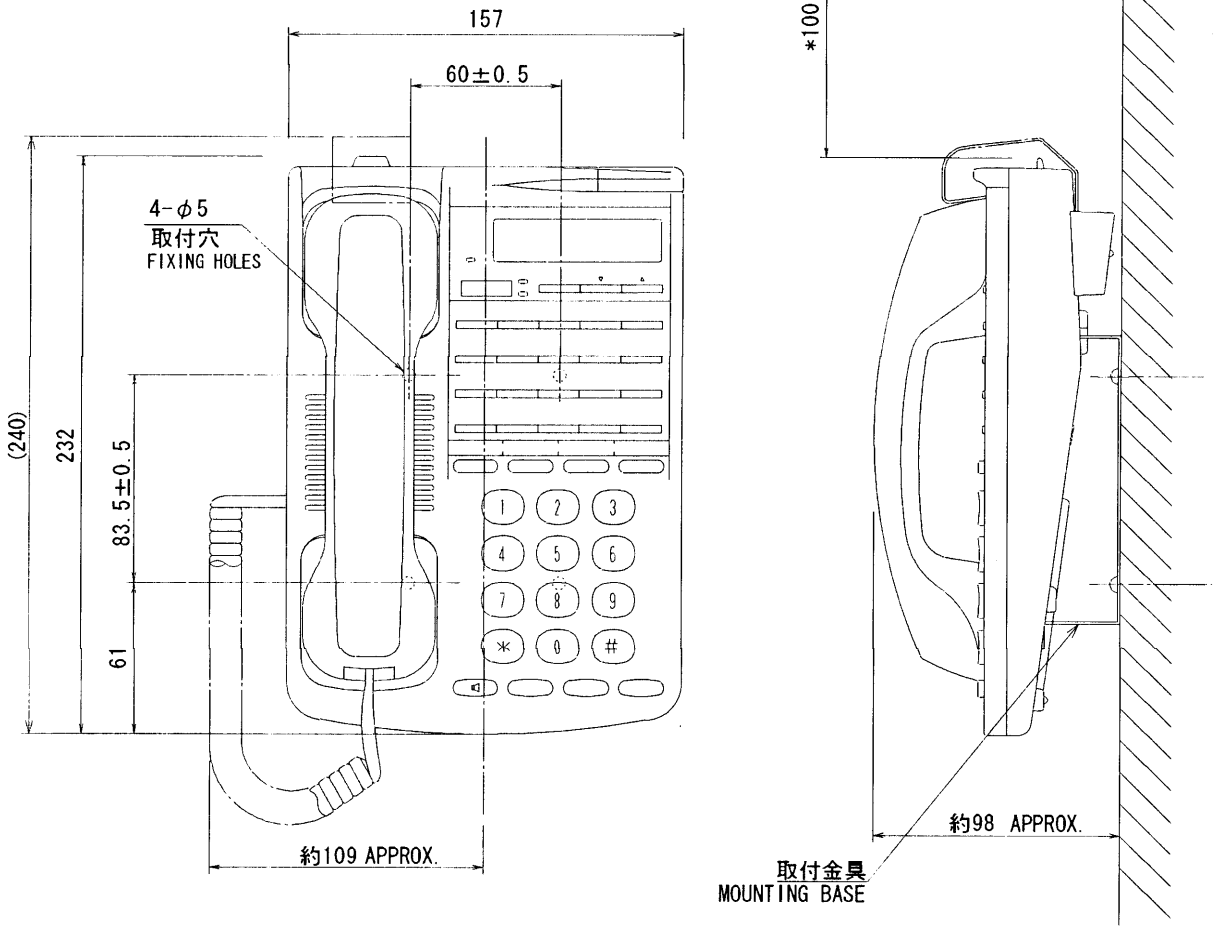
| 範囲 DEMENSION | 公差 TOL. |
|---|---|
| L≦50 | ±1mm |
| 50<L≦100 | ±1mm |
| 100<L≦500 | ±1mm |

表 1
TABLE 1




注 記
1）指定外の寸法公差は表1による。
2）＊：推奨するサービス空間寸法。
3）取付にはトラスタッピンネジ4x16 SUS304を使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. *:RECOMMENDED SERVICE CLEARANCE.
3. USE TAPPING SCREWS 4x16 SUS304 FOR FIXING THE UNIT.

| | | | |
|---|---|---|---|
| DRAWN July26'00 T.YAMASAKI | | TYPE | FC755D1 |
| CHECKED July27'00 Y.K | | 名称 | 電話機（壁掛装備） |
| APPROVED July27'00 Y.K | FELCOM 81 | | 外寸図 |
| SCALE 1/3 | MASS ±10% 0.83 kg | NAME | TELEPHONE (BULKHEAD MOUNT) |
| DWG. No. C5589-G19- B | 16-011-710G- 0 | | OUTLINE DRAWING |

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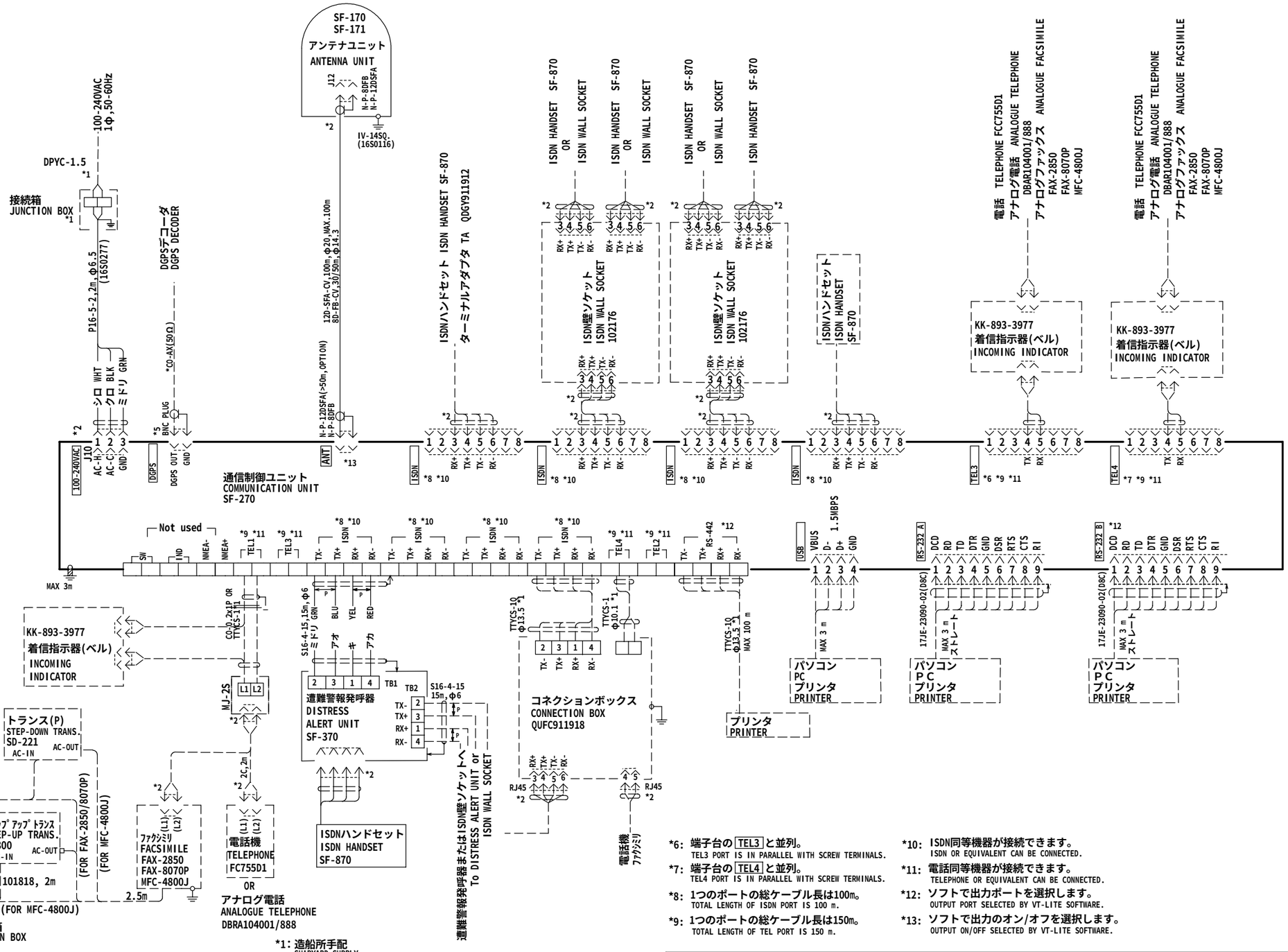
S-1




注記： NOTE:

- ⟨99⟩：コネクタ CONNECTOR
- [99]：端子台 TERMINAL BOARD
- ：ツイストペア線 TWISTED-PAIR
- ：銅板にて接地 GROUNDING COPPER STRAP
- ：IV-14sq. あるいは同等品にて接地 GROUNDING WIRE IV-8sq.

—·—：オプション支給 OPTIONAL SUPPLY
——：現地手配 LOCAL SUPPLY

CO-0.2x1P：CO-SPEVV-SB-C 0.2x1P
CO-0.2x2P：CO-SPEVV-SB-C 0.2x2P, φ10.5

*1: 造船所手配
SHIPYARD SUPPLY

*2: 工場にて取付済
FITTED AT FACTORY.

*3: コネクタのクランプでアースに落とす。
GROUND THROUGH CONNECTOR CLAMP.

*4: [太]は太線を示す。
[B] REPRESENTS THICKER WIRES.

*5: BNCプラグは同軸ケーブルに適合したものを使用。
USE A BNC PLUG ADAPTABLE THE CO-AX CABLE.

*6: 端子台の TEL3 と並列。
TEL3 PORT IS IN PARALLEL WITH SCREW TERMINALS.

*7: 端子台の TEL4 と並列。
TEL4 PORT IS IN PARALLEL WITH SCREW TERMINALS.

*8: 1つのポートの総ケーブル長は100m。
TOTAL LENGTH OF ISDN PORT IS 100 m.

*9: 1つのポートの総ケーブル長は150m。
TOTAL LENGTH OF TEL PORT IS 150 m.

*10: ISDN同等機器が接続できます。
ISDN OR EQUIVALENT CAN BE CONNECTED.

*11: 電話同等機器が接続できます。
TELEPHONE OR EQUIVALENT CAN BE CONNECTED.

*12: ソフトで出力ポートを選択します。
OUTPUT PORT SELECTED BY VT-LITE SOFTWARE.

*13: ソフトで出力のオン/オフを選択します。
OUTPUT ON/OFF SELECTED BY VT-LITE SOFTWARE.

| | | | |
|---|---|---|---|
| DRAWN Nov 12 '03 T. NISHINO | | TITLE | FELCOM 70 |
| CHECKED Takahashi T. | | 名称 | インマルサットFLEET F77 船舶地球局 |
| APPROVED | | | 相互結線図 |
| SCALE / MASS kg | | NAME | INMARSAT FLEET F77 SES |
| DWG No. C5634-C01- A | | | INTERCONNECTION DIAGRAM |

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